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NAVAL UNDERWATER SYSTEMS CENTER
NEW LONDON LABORATORY
NEW LONDON, CONNECTICUT 06320

Technical Memorandum

ACOUSTIC RADIATION FROM TRANSDUCER IN SEMI-INFINITE FLUID MEDIUM

Date: June 19, 1984

Prepared by:
Jayant S. Patel
Engineering Mechanics Division
Engineering & Technical Support Department

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Acoustic pressure pattern due to a vibrating axisymmetric body in a semi-infinite fluid medium is calculated using the results of FIST program in conjunction with the method of images developed in the analysis.

ADMINISTRATIVE INFORMATION

This technical memorandum was prepared under project No. K96714, Acoustic Measurement Program, Principal Investigator J. Miranda Code 38. The sponsoring activity is Naval Underwater Systems Center. The author of this memorandum is located at Naval Underwater Systems Center, New London Laboratory, New London, CT 06320

INTRODUCTION

Far field and near field acoustic pressure patterns are calculated for a cylindrical transducer vibrating in a semi-infinite fluid medium. The method of images is developed to calculate the acoustic pressure in semi-infinite fluid using the results of FIST program. FIST program calculates the radiated and scattered acoustic pressure due to an axisymmetric body in an infinite fluid medium.

ANALYSIS

The method of images is used here to study the acoustic wave propagation in a semi-infinite fluid medium due to vibrating axisymmetric structure.

First we derive here the equations for a structure composed of several axisymmetric components with variously oriented axis of rotation. Then, from that expression, derive the expression for mirror image structure.

The Helmholz boundary value problem gives the pressure $p(r,t)$ at a point in an infinite fluid medium due to prescribed pressure $\bar{\bar{p}}^m$ and velocity $\bar{\bar{V}}^m$ distributions on 'M' number of cavities.

$$p(r,t)=\sum_{m=1}^{M} p^m = \sum_{m=1}^{M} \int_{A_m} \left\{ \bar{\bar{p}}^m(\underline{x}) \frac{\partial G^m}{\partial n} - \bar{\bar{V}}^m G^m \right\} dA_m \qquad (1)$$

Each of the above m variables can be expressed in their own cylindrical coordinate systems. Let

$$p = \sum_{m=1}^{M} \sum_{n=0}^{N_m} p_n^m \cos n\theta^m$$

$$\bar{\bar{p}}^m = \sum_{n=0}^{N_m} \bar{\bar{p}}_n^m \cos n\theta^m \qquad (2)$$

$$\bar{\bar{V}}^m = \sum_{n=0}^{N_m} \bar{\bar{V}}_n^m \cos n\theta^m \qquad (3)$$

Then, as described in detail in the technical report TR 5821, the pressure distribution harmonic coefficient p_n^m can be expressed in terms of the harmonic coefficients of pressure $\bar{\bar{p}}_n^m$ and velocity $\bar{\bar{V}}_n^m$ on the surface of mth cavity.

$$\left\{p_n^m\right\} = \left[H_n^m\right]\left\{\bar{\bar{p}}_n^m\right\} + \left[G_n^m\right]\left\{\bar{\bar{V}}_n^m\right\} \qquad (4)$$

Substituting equation (2) into (1) we have

$$p = \sum_{m=1}^{M} \sum_{n=0}^{N_m} \left\{ \left[H_n^m \right] \left\{ \bar{\bar{P}}_n^m \right\} + \left[G_n^m \right] \left\{ \bar{\bar{V}}_n^m \right\} \right\} \operatorname{Cos} n\Theta^m \quad (5)$$

Consider the case in which only two axisymmetric bodies oriented in arbitrary directions. For this case equation (3) reduces to

$$p = \sum_{n=0}^{N} \left\{ \left[H_n^1 \right] \left\{ \bar{\bar{P}}_n^1 \right\} \operatorname{Cos} n\Theta^1 + \left[G_n^1 \right] \left\{ \bar{\bar{V}}_n^1 \right\} \operatorname{Cos} n\Theta^1 + \left[H_n^2 \right] \left\{ \bar{\bar{P}}_n^2 \right\} \operatorname{Cos} n\Theta^2 + \left[G_n^2 \right] \left\{ \bar{\bar{V}}_n^2 \right\} \operatorname{Cos} n\Theta^2 \right\} \quad (6)$$

Now let us impose the restriction that one cavity is the minor image of the other as shown in Figure 1.

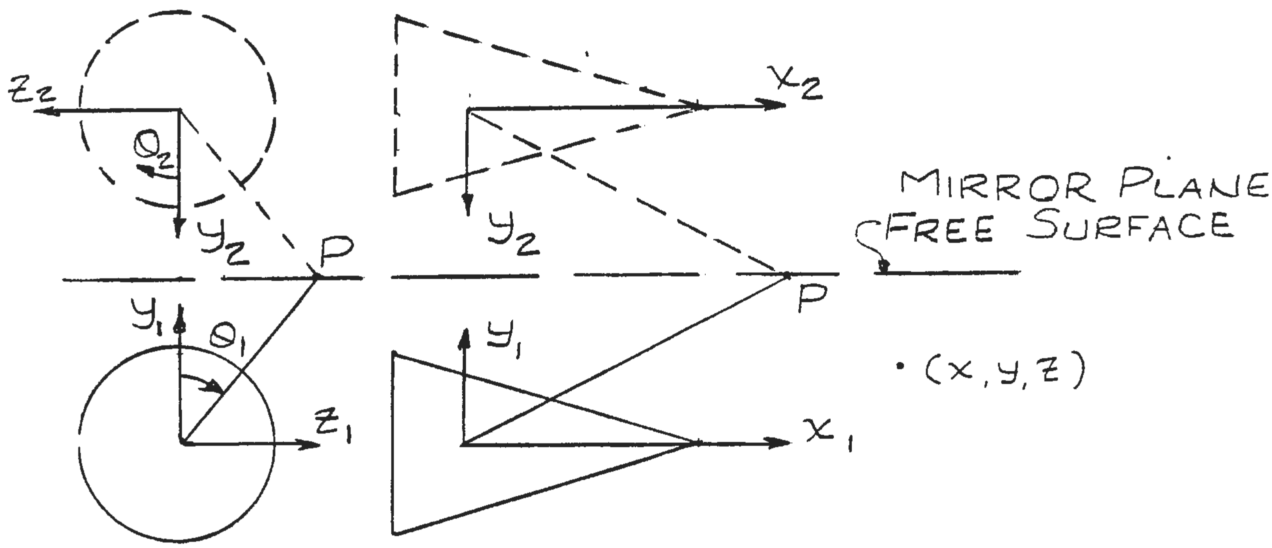


FIGURE 1

Consider a point on the mirror plane. For this point $\Theta_1 = -\Theta_2$ and

$$\operatorname{Cos} n\Theta_1 = \operatorname{Cos} n(-\Theta_2) = \operatorname{Cos} n\Theta_2 = \operatorname{Cos} n\Theta$$

Substituting $\Theta = \Theta_1 = -\Theta_2$ into equation (6) we get

$$p(r,\Theta,z) = \sum_{n=0}^{N} \left\{ \left[H_n^1 \right] \left\{ \bar{\bar{P}}_n^1 \right\} + \left[H_n^2 \right] \left\{ \bar{\bar{P}}_n^2 \right\} + \left[G_n^1 \right] \left\{ \bar{\bar{V}}_n^1 \right\} + \left[G_n^2 \right] \left\{ \bar{\bar{V}}_n^2 \right\} \right\} \operatorname{Cos} n\Theta \quad (7)$$

Since cavity 1 is the mirror image of cavity 2 and point P(x,y,z) on the mirror plane is always equidistant from any two corresponding points, one on each of the two cavities, it is easy to see that the fluid matrices have the following relation

$$[H_n^1] = [H_n^2] \quad ; \quad [G_n^1] = [G_n^2] \qquad (8)$$

Substituting equation (8) into (7) we get

$$p(r,\theta,z) = \sum \left\{ [H_n^1] \left\{ \{\bar{\bar{P}}_n^1\} + \{\bar{\bar{P}}_n^2\} \right\} + [G_n^1] \left\{ \{\bar{\bar{V}}_n^1\} + \{\bar{\bar{V}}_n^2\} \right\} \right\} \operatorname{Cos} n\theta \qquad (9)$$

For pressure $p(r,\theta,z)$ to be identically zero on the mirror plane we can see that the

$$\{\bar{\bar{P}}_n^1\} + \{\bar{\bar{P}}_n^2\} = \{0\} \quad \& \quad \{\bar{\bar{V}}_n^1\} + \{\bar{\bar{V}}_n^2\} = \{0\}$$

$$\{\bar{\bar{P}}_n^1\} = -\{\bar{\bar{P}}_n^2\} = \{\bar{\bar{P}}_n\} \qquad (10)$$

$$\{\bar{\bar{V}}_n^1\} = -\{\bar{\bar{V}}_n^2\} = \{\bar{\bar{V}}_n\} \qquad (11)$$

Imposition of conditions (10) and (11) on the problem gives zero pressure distribution on the mirror plane. Therefore, substitution of equations (10) and (11) into (6) gives the pressure at any point in the semi-infinite fluid

$$p(r,\theta,z) = \sum_{n=0}^{N} \left\{ \left[[H_n^1] \operatorname{Cos} n\theta_1 - [H_n^2] \operatorname{Cos} n\theta_2 \right] \{\bar{\bar{P}}_n\} + \left[[G_n^1] \operatorname{Cos} n\theta_1 - [G_n^2] \operatorname{Cos} n\theta_2 \right] \{\bar{\bar{V}}_n\} \right\} \qquad (12)$$

RESULTS

Experiments were conducted in which the acoustic radiation from transducer which was freely supported at 6.75" below the surface of the tank were measued. The transducer was a solid right circular cylinder of 0.75" diameter and 7" length. Two cases of the vibration of the cylindrical surface of the transducer were considered. In both cases the cylindrical surface was considered vibrating in breathing mode whereas the end caps remained stationary. In the first case all the points were vibrating harmoneously with unit velocity normal to the surface, whereas, in the second case points along cylindrical surface, even though, were vibrating with unit velocity normal to the surface, but with a phase shift given by Ve^{ikx} where $k = \omega/C$, c is sound velocity in water. The excitation frequencies in both cases were 20,000 Hz and 50,000 Hz. A string of hydrophones located at offset distances of 4, 6, 8, and 10" from the transducer and at a depth of 6.75", 7.75", 9.50", 11.25", and 13" from the surface measured the acoustic pressure radiated by the transducer. There were in all twenty-one hydrophones, located on a straight segment at 1° apart. Each hydrophone measured amplitude of the acoustic pressure but did not account for phase difference. The amplitude of acoustic pressure was measured at all the hydrophones at a given depth and then the string was lowered to a new depth for additional measurements. In all, readings were taken with hydrophone string located at five different depths as shown in Figure 2.

Analysis was performed to simulate the above experiment. Since the transducer was located in a tank which had a free surface from which the acoustic waves reflect, analysis used, as described earlier, the method of images. As shown in Figure 2, transducer and its image, which are located equidistant from the surface, but the image having velocity distribution which is 180° out of phase with the transducer, vibrate at same frequency in an infinite fluid medium. The pressure distribution generated by this set is identical with the pressure distribution generated by one transducer below the free surface. Since the string of twenty-one transducers was symmetric with respect to the central plane normal to the axis of rotation as shown in Figure 2, the analysis was performed for eleven transducers for the first case since velocity distribution was also symmetric with respect to the central plane. All twenty-one transducers were used in the second case because of the nonsymmetry of the velocity distribution. Absolute magnitude of the acoustic pressure was calculated at five different depths, that is, at total of fifty-five locations in the first case and at total of one-hundred-five locations in the second case. Following two techniques were performed for averaging.

$$DB_{AVE} = \sum_{i=1}^{N} 20.\log\left\{|p_i|\, r_i/d_j\right\} \qquad (13)$$

$$DB_{AVE.} = 20.\log\left\{\sum_{i=1}^{N}\left\{|p_i|\, r_i/d_j\right\}\right\} \qquad (14)$$

Where N=55 Case I, N=105 Case II, r_i is the location of a given hydrophone in (x_1, y_1, z_1) coordinate system and d_j is the offset distance of the string.

Calculations were performed at four different offset distances as shown in Figure 2.

Further, calculations were performed at 20,000 and 50,000 Hz to give the acoustic pressure distribution along the points 5^o degrees apart on the circumference of circles of 6", 10", and 204" radii for Case I and of 204" radius for Case II. These results are plotted in Figures 3 to 8. In Figures 5 and 6 the solid line refers to the acoustic pressure in infinite medium whereas the dotted line for semi-infinite medium. In Figures 3 and 4 the results are presented for pressures in semi-infinite medium. The solid line refers to the pressure distribution for 10" radius whereas the dotted line refers to the results on 6" radius. Figures 7 and 8 show the farfield pressure in an infinite fluid medium for Case II.

Table 1 gives for Case I velocity distribution the average DB level given by equations (13) and (14), and far field pressure at $\theta = 0$ normalized to offset distance d_j as given by equation 15

$$DB = 20. \text{Log} \left\{ |p_{204}| \cdot 204./d_j \right\} \qquad (15)$$

where

$$|P_{204}| = \begin{cases} 0.2145 \text{ for } f = 50{,}000 \text{ Hz} \\ 0.1158 \text{ for } f = 20{,}000 \text{ Hz} \end{cases}$$

Table II gives average DB level given by equations 13 and 14 for Case II velocity distribution.

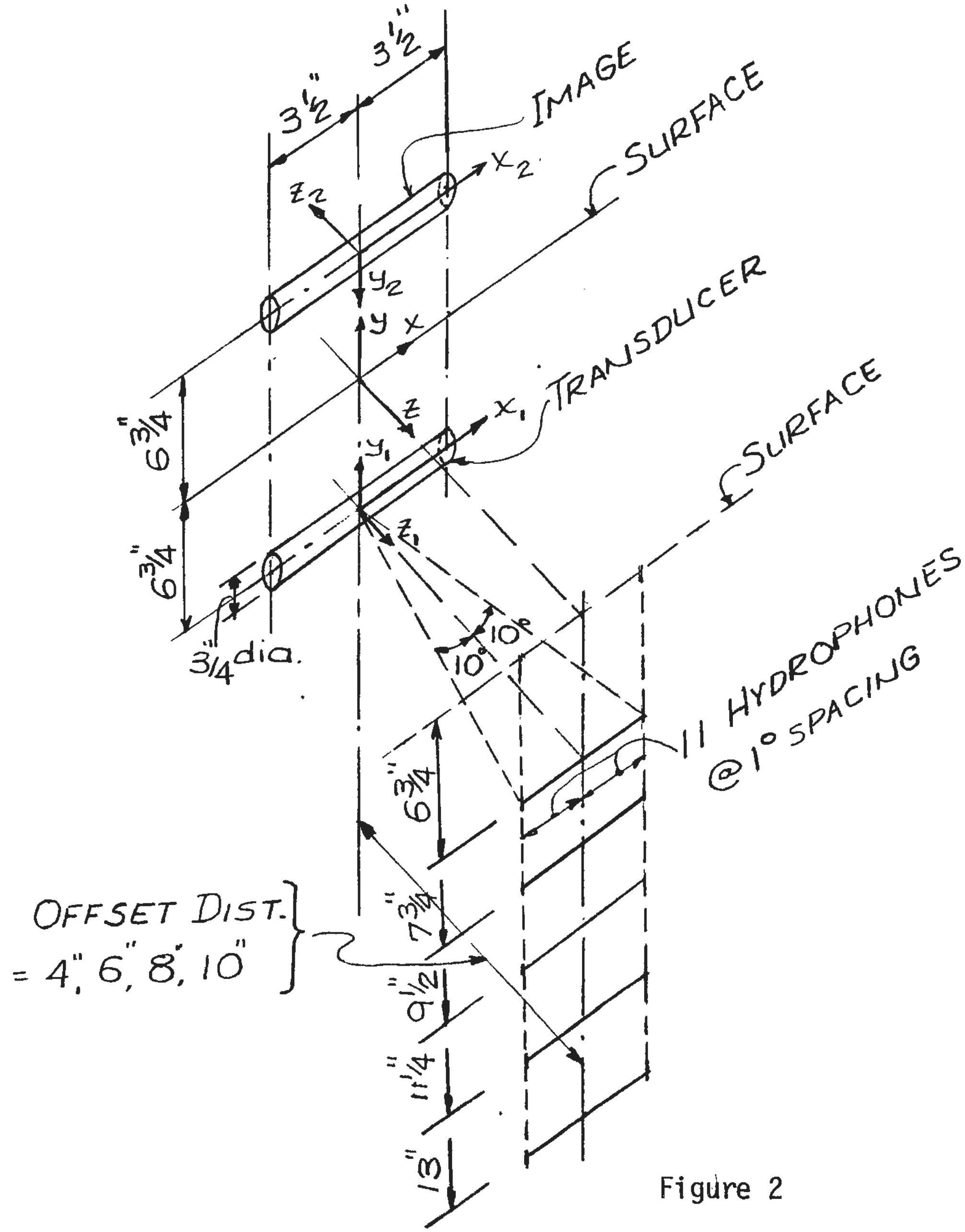

3½"
3½"
IMAGE
SURFACE
TRANSDUCER
SURFACE
6¾"
6¾"
3/4" dia.
10°
10°
11 HYDROPHONES
@1° SPACING
6¾"
7¾"
9½"
11¼"
13"
OFFSET DIST.
= 4", 6", 8", 10"

Figure 2

RESULTS FOR f = 20,000 Hz

dj	(13)	(14)	(15)
4	11.98	11.63	15.43
6	8.47	7.90	11.91
8	9.06	8.73	9.41
10	8.42	7.66	7.47

RESULTS FOR f = 50,000 Hz

dj	(13)	(14)	(15)
4	12.76	12.42	20.78
6	11.29	11.02	17.26
8	10.58	9.30	14.76
10	10.66	10.37	12.82

NORMALIZED AVERAGE DB LEVEL USING

FORMULAS (13), (14), (15) FOR

UNIFORM VELOCITY, CASE I,

DISTRIBUTION

TABLE I

RESULTS FOR f = 20,000 Hz

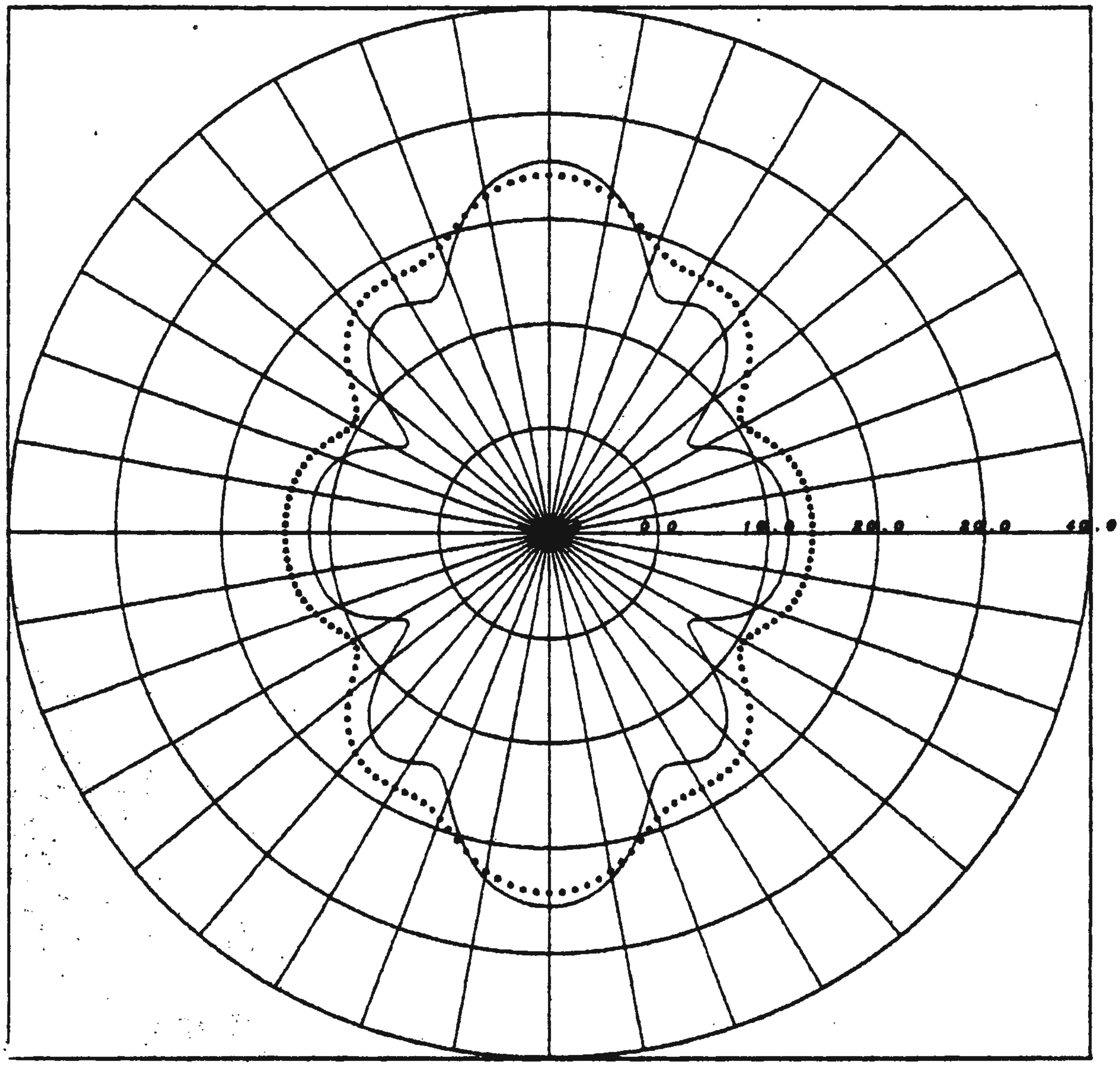
dj	(13)	(14)
4	-2.04	-2.26
6	-7.08	-7.38
8	-8.49	-8.70
10	-11.2	-11.70

RESULTS FOR f = 50,000 Hz

dj	(13)	(14)
4	-1.15	-2.48
6	-5.85	-7.04
8	-8.37	-9.77
10	-9.05	-10.20

NORMALIZED AVERAGE DB LEVEL USING
FORMULAS (13) AND (14) FOR
e^{ikx} VELOCITY, CASE II,
DISTRIBUTION

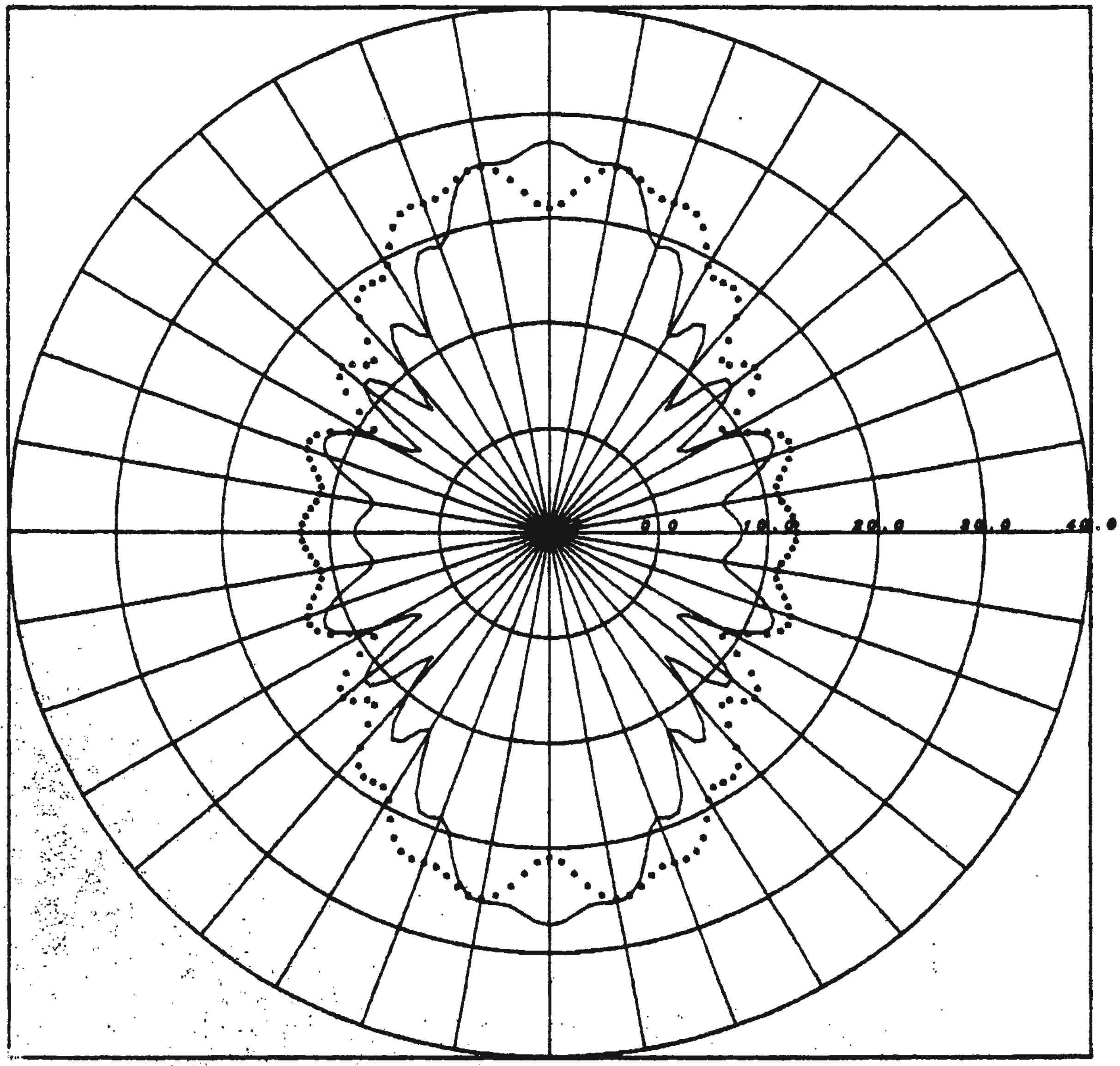
TABLE 2



——— Pressure on 10" Radius Circle
······· Pressure on 6" Radius Circle

DB Pressure Variation due to Transducer Vibrating at f=20,000 Hz in Semi-infinite Fluid with Uniform Velocity Distribution

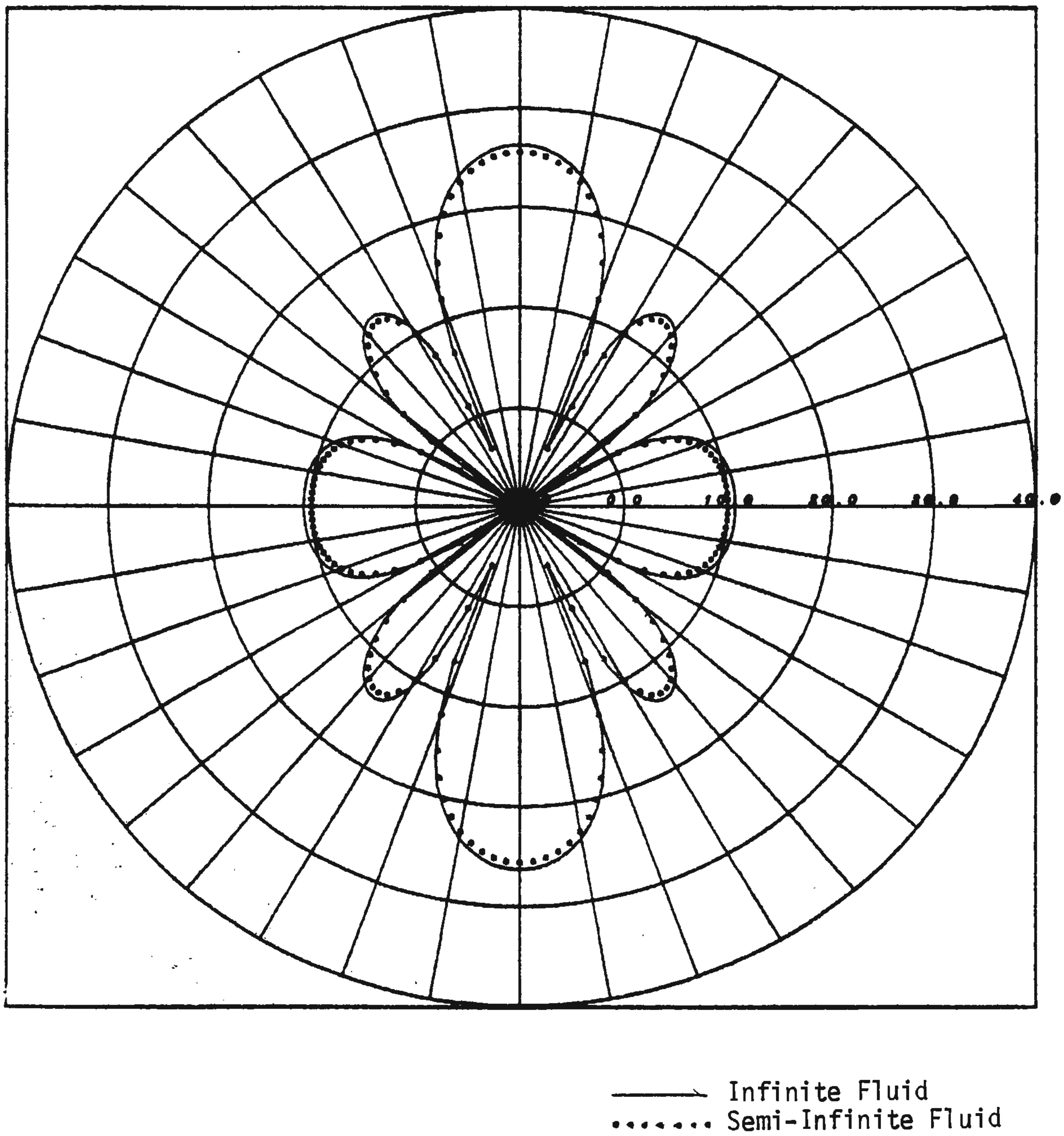
Figure 3



——— Pressure on 10" Radius Circle
...... Pressure on 6" Radius Circle

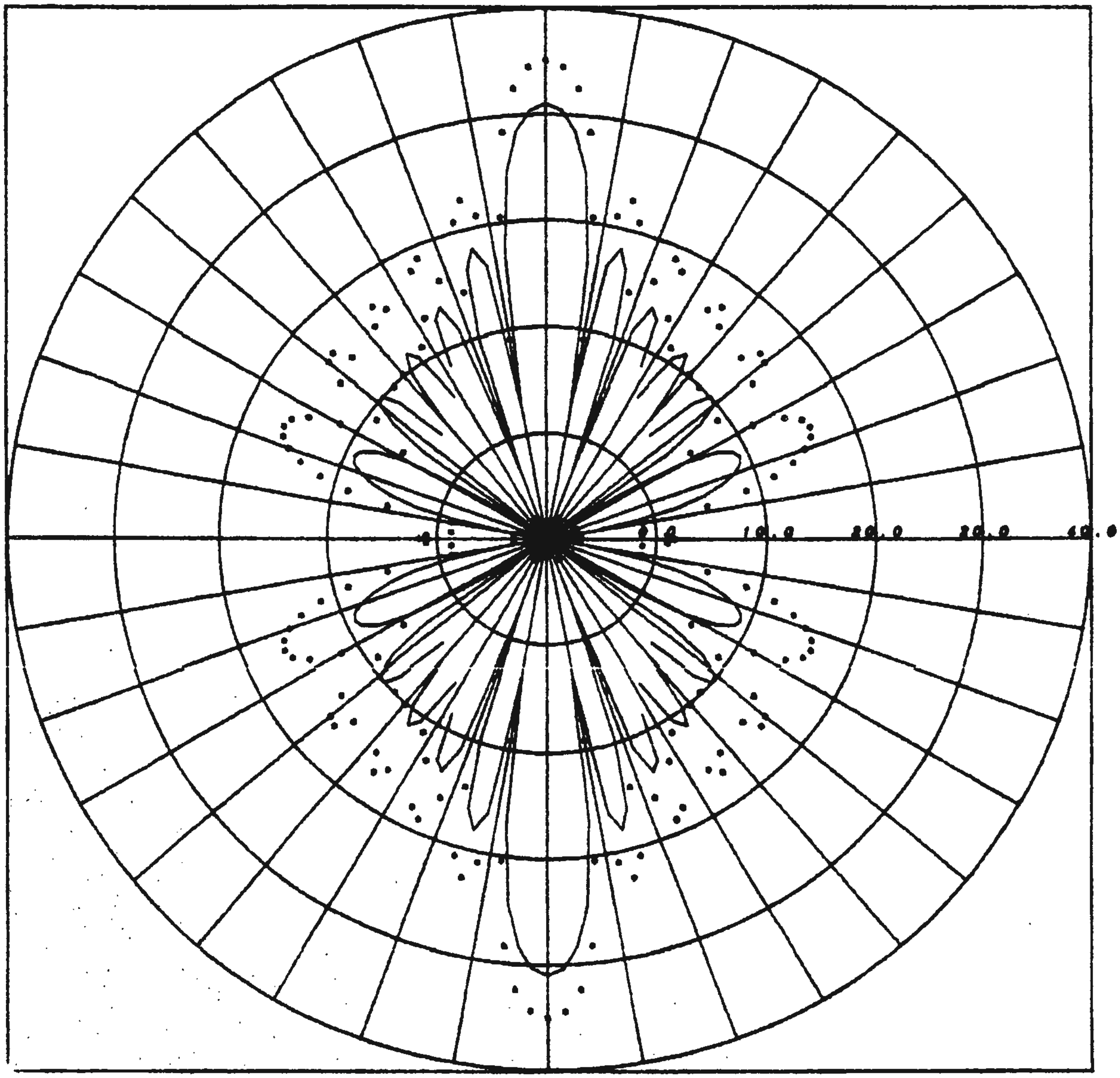
DB Pressure Variation Due to Transducer Vibrating at f=50,000 Hz in Semi-Infinite Fluid with Uniform Velocity Distribution

Figure 4



DB Pressure Variation at Far Field due to Transducer Vibrating At f=20,000 Hz with Uniform Velocity Distribution

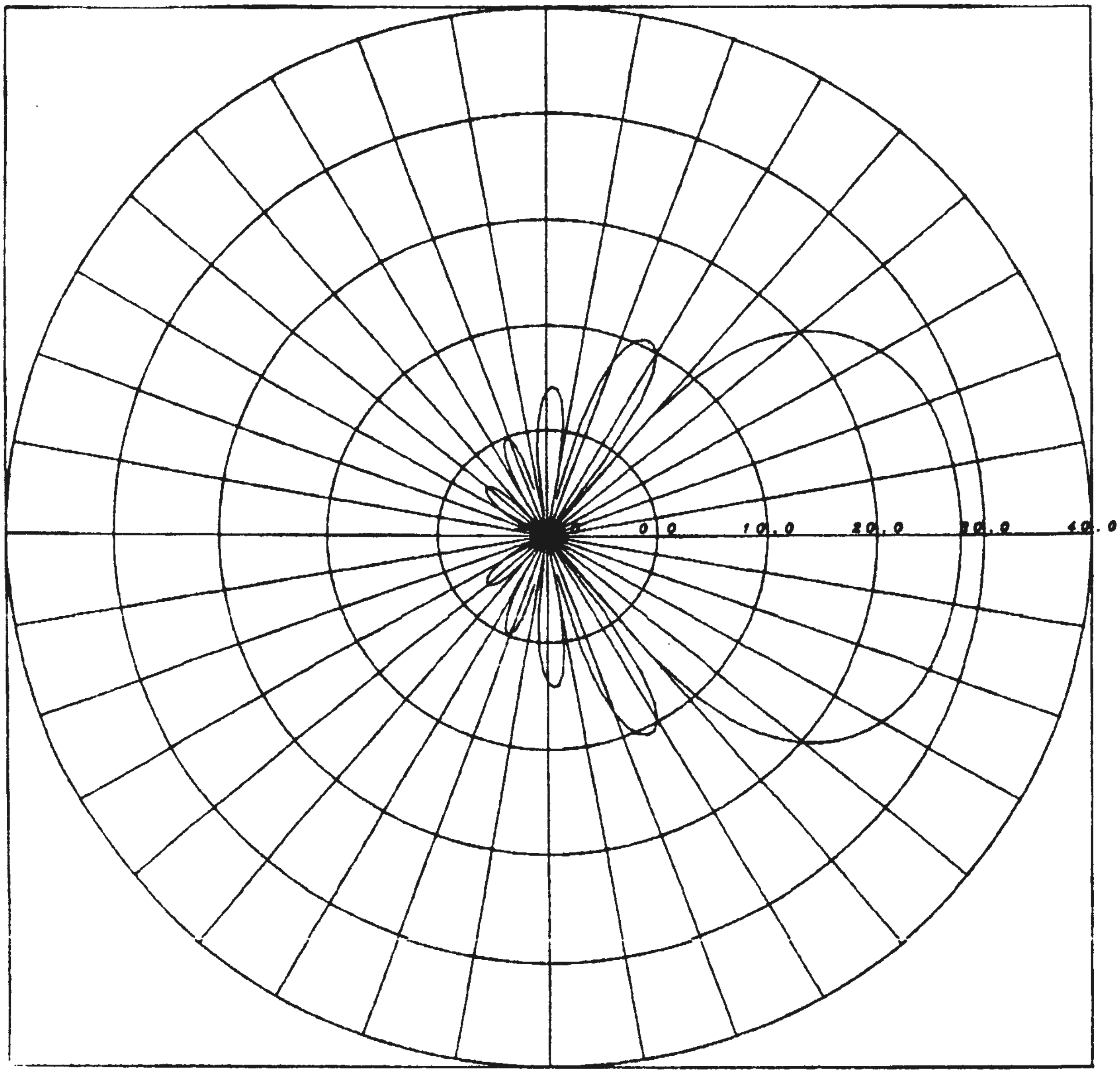
Figure 5



——— Infinite Fluid
• • • • • • • Semi-Infinite Fluid

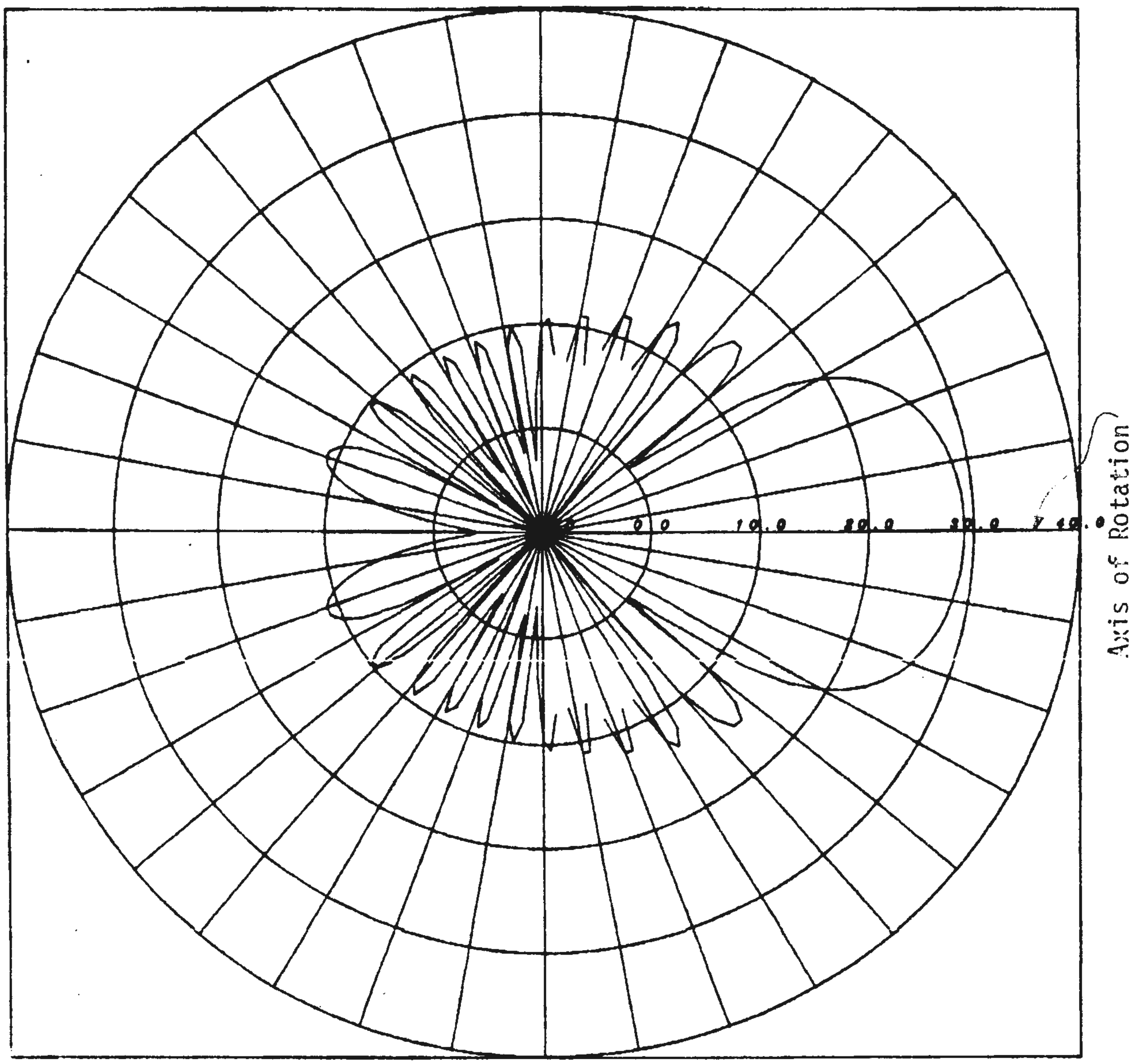
DB Pressure Variation at Far Field due to Transducer Vibrating
At 50,000 Hz

Figure 6



DB Pressure Variation in Infinite Fluid at Far Field Due to Transducer Vibrating at 20,000 Hz With Ve^{ikx} Velocity Distribution

Figure 7



DB Pressure Variation in Infinite Fluid at Far Field Due to Transducer Vibrating at 50,000 Hz With Ve^{ikx} Velocity Distribution

Figure 8

APPENDIX A

FIST MODEL AND COMPUTATIONS

Transducer is a solid right circular cylinder of 7" length and 0.75" diameter. As shown in figure A-1, the generator of the cylinder is divided into 62 segments. Stations 4 to 60 are subject to unit velocity normal to the surface for Cases I and II whereas stations 1 to 3 and 61 to 63 on the end caps remain stationary. Input velocity distribution represent the motion in breathing mode, i.e., n = o in equations 1 to 9.

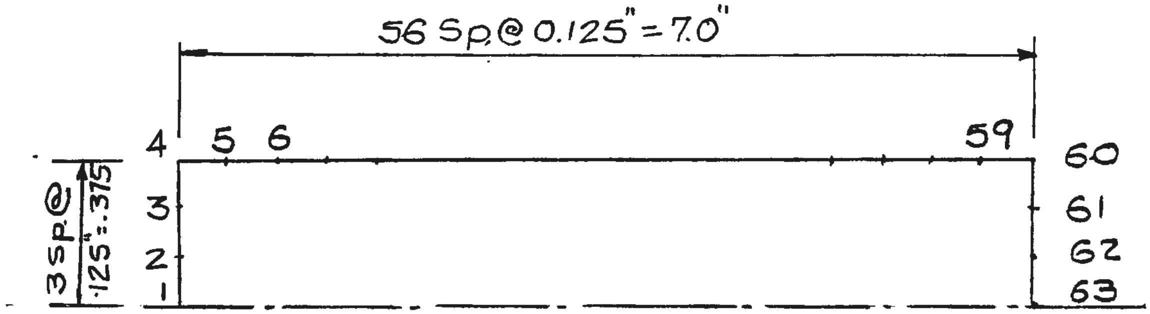
Equation 12 reduces to

$$p(r,\theta,z) = \left[\left[H_o^1\right] - \left[H_o^2\right]\right]\left\{\bar{\bar{P}}_o\right\} + \left[\left[G_o^1\right] - \left[G_o^2\right]\right]\left\{\bar{\bar{V}}_o\right\} \quad \text{— A-1}$$

where superscripts 1 and 2 refer to the transducer and its image, respectively.

Computations of fluid matrices $[H]$ and $[G]$ requires geometrical information supplied by figure A-1, and the locations of exterior points, both as listed in the input data for FIST program.

The output of FIST program follows the listing of the input to FIST program. The message "ERROR OF ITERATION FACTOR" is 0 signifies that the frequency of excitation is not at one of the interior resonance frequencies and as a result analysis do not require use of interior points. Three columns of numbers under the title "TOTAL ACOUSTIC PRESSURE ON EXTERIOR POINTS" are the real part, imaginary part and the absolute magnitude of the complex pressure in infinite medium at the locations of hydrophones. In the listing of the exterior points in the FIST input data, there are 210 points which represent ten sets of twenty-one numbers, each set refering to a string of twenty-one hydrophones at a given depth. The first set of twenty-one numbers refers to the string of hydrophones with respect to the transducer and the second set refers to the same string of hydrophones with respect to the "image" transducer. The string of hydrophones are located at five different depths giving ten sets of exterior points. The complex sum of pressures at jth hydrophone due to transducer and its image gives the acoutic pressure at jth hydrophone in semiinfinite medium. In the listed output there are five sets of results, each set refers the results to a hydrophone string located at one of the five prescribed depths. At the bottom of each set these results are averaged using the formulas 13 and 14, for N= 21 and at the end of the output average level of acoustic pressure using formulas 13 and 14 for N=105 are calculated.


56 Sp@ 0.125" = 7.0"
4
5
6
59
60
3
61
2
62
1
63
3 sp@ .125" = .375

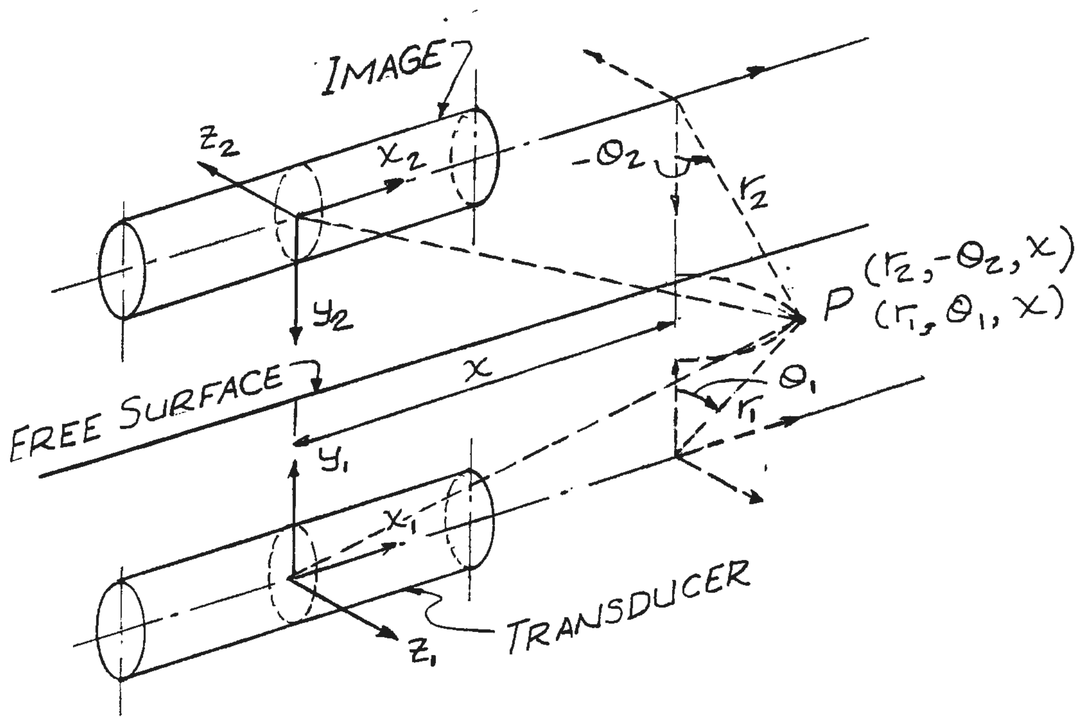


IMAGE
z_2
x_2
$-\theta_2$
r_2
P
$(r_2, -\theta_2, x)$
(r_1, θ_1, x)
y_2
FREE SURFACE
x
θ_1
r_1
y_1
x_1
TRANSDUCER
z_1

Figure A-1

INPUT TO FIST PROGRAM

P ω C

63 POINTS ON CYLINDER GENERATOR

```
RUBEGA CYLINDER IN SEMI-INFINITE FLUID,F=50000.HZ
0.00009388,314159.265,58308.,63,0,0,0,0
210,0
-3.5,0.,90.,0.
-3.5,0.125,90.,90.
-3.5,0.25,90.,90.
-3.5,0.375,0.,90.
-3.375,0.375,0.,0.
-3.25,0.375,0.,0.
-3.125,0.375,0.,0.
-3.0,0.375,0.,0.
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-2.75,0.375,0.,0.
-2.625,0.375,0.,0.
-2.5,0.375,0.,0.
-2.375,0.375,0.,0.
-2.25,0.375,0.,0.
-2.125,0.375,0.,0.
-2.0,0.375,0.,0.
-1.875,0.375,0.,0.
-1.75,0.375,0.,0.
-1.625,0.375,0.,0.
-1.5,0.375,0.,0.
-1.375,0.375,0.,0.
-1.25,0.375,0.,0.
-1.125,0.375,0.,0.
-1.0,0.375,0.,0.
-.875,0.375,0.,0.
-0.75,0.375,0.,0.
-0.625,0.375,0.,0.
-0.5,0.375,0.,0.
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0.75,0.375,0.,0.
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3.125,0.375,0.,0.
3.25,0.375,0.,0.
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3,5,0.375,-90.,0.
3,5,0.25,-90.,-90.
3,5,0.125,-90.,-90.
3,5,0.,0.,-90.

EXTERIOR POINTS

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-0,95030659	6,00000000
-0,84324503	6,00000000
-0,73670733	6,00000000
-0,63062543	6,00000000
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-0,41956085	6,00000000
-0.31444669	6.00000000
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0,95030659	6,08276272
1,05796194	6,08276272
-1,05796194	15,69235516
-0,95030659	15,69235516
-0,84324503	15,69235516
-0,73670733	15,69235516
-0,63062543	15,69235516
-0,52493197	15,69235516
-0,41956085	15,69235516
-0,31444669	15,69235516
-0,20952460	15,69235516
-0,10473038	15,69235516
0,00000000	15,69235516
0,10473038	15,69235516
0,20952460	15,69235516
0,31444669	15,69235516
0,41956085	15,69235516
0,52493197	15,69235516
0,63062543	15,69235516
0,73670733	15,69235516
0,84324503	15,69235516
0,95030659	15,69235516
1,05796194	15,69235516
-1,05796194	6,60018921
-0,95030659	6,60018921
-0,84324503	6,60018921
-0,73670733	6,60018921
-0,63062543	6,60018921
-0,52493197	6,60018921
-0,41956085	6,60018921
-0,31444669	6,60018921
-0,20952460	6,60018921
-0,10473038	6,60018921
0,00000000	6,60018921
0,10473038	6,60018921
0,20952460	6,60018921
0,31444669	6,60018921
0,41956085	6,60018921
0,52493197	6,60018921
0,63062543	6,60018921
0,73670733	6,60018921
0,84324503	6,60018921
0,95030659	6,60018921
1,05796194	6,60018921
-1,05796194	17,32231140
-0,95030659	17,32231140
-0,84324503	17,32231140
-0,73670733	17,32231140
-0,63062543	17,32231140
-0,52493197	17,32231140
-0,41956085	17,32231140
-0,31444669	17,32231140
-0,20952460	17,32231140
-0,10473038	17,32231140
0,00000000	17,32231140
0,10473038	17,32231140

0,20952460	17,32231140
0,31444669	17,32231140
0,41956085	17,32231140
0,52493197	17,32231140
0,63062543	17,32231140
0,73670733	17,32231140
0,84324503	17,32231140
0,95030659	17,32231140
1,05796194	17,32231140
-1,05796194	7,50000000
-0,95030659	7,50000000
-0,84324503	7,50000000
-0,73670733	7,50000000
-0,63062543	7,50000000
-0,52493197	7,50000000
-0,41956085	7,50000000
-0,31444669	7,50000000
-0,20952460	7,50000000
-0,10473038	7,50000000
0,00000000	7,50000000
0,10473038	7,50000000
0,20952460	7,50000000
0,31444669	7,50000000
0,41956085	7,50000000
0,52493197	7,50000000
0,63062543	7,50000000
0,73670733	7,50000000
0,84324503	7,50000000
0,95030659	7,50000000
1,05796194	7,50000000
-1,05796194	18,97366524
-0,95030659	18,97366524
-0,84324503	18,97366524
-0,73670733	18,97366524
-0,63062543	18,97366524
-0,52493197	18,97366524
-0,41956085	18,97366524
-0,31444669	18,97366524
-0,20952460	18,97366524
-0,10473038	18,97366524
0,00000000	18,97366524
0,10473038	18,97366524
0,20952460	18,97366524
0,31444669	18,97366524
0,41956085	18,97366524
0,52493197	18,97366524
0,63062543	18,97366524
0,73670733	18,97366524
0,84324503	18,97366524
0,95030659	18,97366524
1,05796194	18,97366524
-1,05796194	8,66386127
-0,95030659	8,66386127
-0,84324503	8,66386127
-0,73670733	8,66386127
-0,63062543	8,66386127
-0,52493197	8,66386127
-0,41956085	8,66386127
-0,31444669	8,66386127
-0,20952460	8,66386127
-0,10473038	8,66386127

0,00000000	8,66386127
0,10473038	8,66386127
0,20952460	8,66386127
0,31444669	8,66386127
0,41956085	8,66386127
0,52493197	8,66386127
0,63062543	8,66386127
0,73670733	8,66386127
0,84324503	8,66386127
0,95030659	8,66386127
1,05796194	8,66386127
-1,05796194	20,64128113
-0,95030659	20,64128113
-0,84324503	20,64128113
-0,73670733	20,64128113
-0,63062543	20,64128113
-0,52493197	20,64128113
-0,41956085	20,64128113
-0,31444669	20,64128113
-0,20952460	20,64128113
-0,10473038	20,64128113
0,00000000	20,64128113
0,10473038	20,64128113
0,20952460	20,64128113
0,31444669	20,64128113
0,41956085	20,64128113
0,52493197	20,64128113
0,63062543	20,64128113
0,73670733	20,64128113
0,84324503	20,64128113
0,95030659	20,64128113
1,05796194	20,64128113

VELOCITY DISTRIBUTION CASE II, $V_i = 1 + e^{jkx_i}$

$Re(V_i)$

$\leftarrow Im(V_i)$

0,00000000	0,00000000	0,00000000	0,00000000	0,00000000	0,00000000
1,00000000	0,00000000	0,78164911	0,62371844	0,22195065	0,97505790
-0,43467417	0,90058780	-0,90147585	0,43282947	-0,97460145	-0,22394644
-0,62211674	-0,78292447	0,00204707	-0,99999791	0,62531734	-0,78037059
0,97551024	-0,21995394	0,89969599	0,43651703	0,43098319	0,90235996
-0,22594151	0,97414088	-0,78419638	0,62051272	-0,99999160	-0,00409414
-0,77908862	-0,62691385	-0,21795653	-0,97595847	0,43835744	-0,89880073
0,90324056	-0,42913464	0,97367644	0,22793470	0,61890578	0,78546524
-0,00614166	0,99998111	-0,62850702	0,77780390	-0,97640270	0,21595776
-0,89790088	-0,44019771	-0,42728433	-0,90411736	0,22992788	-0,97320771
0,78673023	-0,61729693	0,99996644	0,00818820	0,77651602	0,63009757
0,21395807	0,97684288	-0,44203442	0,89699811	-0,90498990	0,42543307
-0,97273511	-0,23191915	-0,61568552	-0,78799194	0,01023662	-0,99994755
0,63168693	-0,77522361	0,97727871	-0,21195842	0,89609152	0,44386929
0,42358002	0,90585870	-0,23391132	0,97225797	-0,78925157	0,61407006
-0,99992454	-0,01228309	-0,77392918	-0,63327217	-0,20995788	-0,97771043
0,44570231	-0,89518124	0,90672451	-0,42172348	0,97177720	0,23590066
0,61245197	0,79050779	-0,01432950	0,99989730	-0,63485622	0,77263027
-0,97813809	0,20795646	-0,89426637	-0,44753516	-0,41986862	-0,90758491
0,23788899	-0,97129238	0,79175961	-0,61083281	0,99966589	0,01637586
0,00000000	0,00000000	0,00000000	0,00000000	0,00000000	0,00000000
0,00000000	0,00000000	0,00000000	0,00000000	0,00000000	0,00000000
0,00000000	5,38792706	-3,36054945	4,21146822	-5,25354099	1,19585395
-4,85230112	-2,34199286	-2,33205366	-4,85708618	1,20660710	-5,25106147
4,21833992	-3,35191965	5,38791561	0,01102948	4,20457983	3,36916423
1,18509579	5,25597811	-2,35192204	4,84749651	-4,86184978	2,32210588
-5,24860001	-1,21735632	-3,34327722	-4,22519302	0,02205891	-5,38786176
3,37776613	-4,19767284	5,25839281	-1,17433393	4,84267282	2,36183786
2,31214619	4,86659431	-1,22809553	5,24609756	-4,23202944	3,33461928

-5,38782549	-0,03309081	-4,19075060	-3,38634992	-1,16356468	-5,26078653
2,37175322	-4,83782434	4,87131634	-2,30217671	5,24357224	1,23683462
3,32595086	4,23884487	-0,04411745	5,38774633	-3,39491963	4,18381166
-5,26315832	1,15279043	-4,83296061	-2,38164926	-2,29220223	-4,87601948
1,24956346	-5,24102592	4,24564314	-3,31726861	5,38764429	0,05515417
4,17684841	3,40348315	1,14201653	5,26550627	-2,39153528	4,82807589
-4,88070059	2,28221822	-5,23845482	-1,26029718	-3,30856466	-4.25242996
0,06618038	-5,38752031	3,41202426	-4,16987419	5,26783228	-1,13123775
4,82317114	2,40141153	2,27221537	4,88536549	-1,27101552	5,23586464
-4,25919819	3,29984605	-5,38737392	-0,07720632	-4,16287565	-3,42055893
-1,12045431	-5,27013683	2,41128683	-4,81824207	4,89000130	-2,26222157
5,23325253	1,28172851	3,29112267	4,26594305	-0,08823193	5,38720465
0,00000000	0,00000000	0,00000000	0,00000000	0,00000000	0,00000000

FIST OUTPUT

**** THE PROBLEM SOLVED HERE IS R UB EG A CY LI ND ER

A-9

FOLLOWING ARE X,Y COORDINATES,ALPHA1 AND ALPHL ANGLES

-3,50000	0,00000	90,00000	0,00000
-3,50000	0,12500	90,00000	90,00000
-3,50000	0,25000	90,00000	90,00000
-3,50000	0,37500	0,00000	90,00000
-3,37500	0,37500	0,00000	0,00000
-3,25000	0,37500	0,00000	0,00000
-3,12500	0,37500	0,00000	0,00000
-3,00000	0,37500	0,00000	0,00000
-2,87500	0,37500	0,00000	0,00000
-2,75000	0,37500	0,00000	0,00000
-2,62500	0,37500	0,00000	0,00000
-2,50000	0,37500	0,00000	0,00000
-2,37500	0,37500	0,00000	0,00000
-2,25000	0,37500	0,00000	0,00000
-2,12500	0,37500	0,00000	0,00000
-2,00000	0,37500	0,00000	0,00000
-1,87500	0,37500	0,00000	0,00000
-1,75000	0,37500	0,00000	0,00000
-1,62500	0,37500	0,00000	0,00000
-1,50000	0,37500	0,00000	0,00000
-1,37500	0,37500	0,00000	0,00000
-1,25000	0,37500	0,00000	0,00000
-1,12500	0,37500	0,00000	0,00000
-1,00000	0,37500	0,00000	0,00000
-0,87500	0,37500	0,00000	0,00000
-0,75000	0,37500	0,00000	0,00000
-0,62500	0,37500	0,00000	0,00000
-0,50000	0,37500	0,00000	0,00000
-0,37500	0,37500	0,00000	0,00000
-0,25000	0,37500	0,00000	0,00000
-0,12500	0,37500	0,00000	0,00000
0,00000	0,37500	0,00000	0,00000
0,12500	0,37500	0,00000	0,00000
0.25000	0,37500	0,00000	0,00000

TM No. 841087

0,37500	0,37500	0,00000	0,00000
0,50000	0,37500	0,00000	0,00000
0,62500	0,37500	0,00000	0,00000
0,75000	0,37500	0,00000	0,00000
0,87500	0,37500	0,00000	0,00000
1,00000	0,37500	0,00000	0,00000
1,12500	0,37500	0,00000	0,00000
1,25000	0,37500	0,00000	0,00000
1,37500	0,37500	0,00000	0,00000
1,50000	0,37500	0,00000	0,00000
1,62500	0,37500	0,00000	0,00000
1,75000	0,37500	0,00000	0,00000
1,87500	0,37500	0,00000	0,00000
2,00000	0,37500	0,00000	0,00000
2,12500	0,37500	0,00000	0,00000
2,25000	0,37500	0,00000	0,00000
2,37500	0,37500	0,00000	0,00000
2,50000	0,37500	0,00000	0,00000
2,62500	0,37500	0,00000	0,00000
2,75000	0,37500	0,00000	0,00000
2,87500	0,37500	0,00000	0,00000
3,00000	0,37500	0,00000	0,00000
3,12500	0,37500	0,00000	0,00000
3,25000	0,37500	0,00000	0,00000
3,37500	0,37500	0,00000	0,00000
3,50000	0,37500	-90,00000	0,00000
3,50000	0,25000	-90,00000	-90,00000
3,50000	0,12500	-90,00000	-90,00000
3,50000	0,00000	0,00000	-90,00000

FOLLOWING IS THE TABLE OF EXTERIOR POINTS

NO	X-COORD,	Y COORD,
1	-1,057962	6,000000
2	-0,950307	6,000000
3	-0,843245	6,000000
4	-0,736707	6,000000
5	-0,630625	6,000000
6	-0,524932	6,000000
7	-0,419561	6,000000
8	-0,314447	6,000000
9	-0,209525	6,000000
10	-0,104730	6,000000
11	0,000000	6,000000
12	0,104730	6,000000
13	0,209525	6,000000
14	0,314447	6,000000
15	0,419561	6,000000
16	0,524932	6,000000
17	0,630625	6,000000
18	0,736707	6,000000
19	0,843245	6,000000
20	0,950307	6,000000
21	1,057962	6,000000
22	-1,057962	14,773287
23	-0,950307	14,773287
24	-0,843245	14,773287
25	-0,736707	14,773287
26	-0,630625	14,773287
27	-0,524932	14,773287

28	-0,419561	14.773287
29	-0,314447	14.773287
30	-0,209525	14.773287
31	-0,104730	14.773287
32	0,000000	14.773287
33	0,104730	14.773287
34	0,209525	14.773287
35	0,314447	14.773287
36	0,419561	14.773287
37	0,524932	14.773287
38	0,630625	14.773287
39	0,736707	14.773287
40	0,843245	14.773287
41	0,950307	14.773287
42	1,057962	14.773287
43	-1,057962	6,082763
44	-0,950307	6,082763
45	-0,843245	6,082763
46	-0,736707	6,082763
47	-0,630625	6,082763
48	-0,524932	6,082763
49	-0,419561	6,082763
50	-0,314447	6,082763
51	-0,209525	6,082763
52	-0,104730	6,082763
53	0,000000	6,082763
54	0,104730	6,082763
55	0,209525	6,082763
56	0,314447	6,082763
57	0,419561	6,082763
58	0,524932	6,082763
59	0,630625	6,082763
60	0,736707	6,082763
61	0,843245	6,082763
62	0,950307	6,082763
63	1,057962	6,082763
64	-1,057962	15,692355
65	-0,950307	15,692355
66	-0,843245	15,692356
67	-0,736707	15,692355
68	-0,630625	15,692355
69	-0,524932	15,692355
70	-0,419561	15,692356
71	-0,314447	15,692355
72	-0,209525	15,692355
73	-0,104730	15,692355
74	0,000000	15,692355
75	0,104730	15,692355
76	0,209525	15,692355
77	0,314447	15,692355
78	0,419561	15,692355
79	0,524932	15,692355
80	0,630625	15,692355
81	0,736707	15,692355
82	0,843245	15,692355
83	0,950307	15,692355
84	1,057962	15,692355
85	-1,057962	6.600189
86	-0,950307	6.600189
87	-0,843245	6.600189
88	-0,736707	6.600189

89	-0,630625	6,600189
90	-0,524932	6,600189
91	-0,419561	6,600189
92	-0,314447	6,600189
93	-0,209525	6,600189
94	-0,104730	6,600189
95	0,000000	6,600189
96	0,104730	6,600189
97	0,209525	6,600189
98	0,314447	6,600189
99	0,419561	6,600189
100	0,524932	6,600189
101	0,630625	6,600189
102	0,736707	6,600189
103	0,843245	6,600189
104	0,950307	6,600189
105	1,057962	6,600189
106	-1,057962	17,322311
107	-0,950307	17,322311
108	-0,843245	17,322311
109	-0,736707	17,322311
110	-0,630625	17,322311
111	-0,524932	17,322311
112	-0,419561	17,322311
113	-0,314447	17,322311
114	-0,209525	17,322311
115	-0,104730	17,322311
116	0,000000	17,322311
117	0,104730	17,322311
118	0,209525	17,322311
119	0,314447	17,322311
120	0,419561	17,322311
121	0,524932	17,322311
122	0,630625	17,322311
123	0,736707	17,322311
124	0,843245	17,322311
125	0,950307	17,322311
126	1,057962	17,322311
127	-1,057962	7,500000
128	-0,950307	7,500000
129	-0,843245	7,500000
130	-0,736707	7,500000
131	-0,630625	7,500000
132	-0,524932	7,500000
133	-0,419561	7,500000
134	-0,314447	7,500000
135	-0,209525	7,500000
136	-0,104730	7,500000
137	0,000000	7,500000
138	0,104730	7,500000
139	0,209525	7,500000
140	0,314447	7,500000
141	0,419561	7,500000
142	0,524932	7,500000
143	0,630625	7,500000
144	0,736707	7,500000
145	0,843245	7,500000
146	0,950307	7,500000
147	1,057962	7,500000
148	-1,057962	18,973665
149	-0,950307	18,973665

150	-0,843245	18,973665
151	-0,736707	18,973665
152	-0,630625	18,973665
153	-0,524932	18,973665
154	-0,419561	18,973665
155	-0,314447	18,973665
156	-0,209525	18,973665
157	-0,104730	18,973665
158	0,000000	18,973665
159	0,104730	18,973665
160	0,209525	18,973665
161	0,314447	18,973665
162	0,419561	18,973665
163	0,524932	18,973665
164	0,630625	18,973665
165	0,736707	18,973665
166	0,843245	18,973665
167	0,950307	18,973665
168	1,057962	18,973665
169	-1,057962	8,663861
170	-0,950307	8,663861
171	-0,843245	8,663861
172	-0,736707	8,663861
173	-0,630625	8,663861
174	-0,524932	8,663861
175	-0,419561	8,663861
176	-0,314447	8,663861
177	-0,209525	8,663861
178	-0,104730	8,663861
179	0,000000	8,663861
180	0,104730	8,663861
181	0,209525	8,663861
182	0,314447	8,663861
183	0,419561	8,663861
184	0,524932	8,663861
185	0,630625	8,663861
186	0,736707	8,663861
187	0,843245	8,663861
188	0,950307	8,663861
189	1,057962	8,663861
190	-1,057962	20,641281
191	-0,950307	20,641281
192	-0,843245	20,641281
193	-0,736707	20,641281
194	-0,630625	20,641281
195	-0,524932	20,641281
196	-0,419561	20,641281
197	-0,314447	20,641281
198	-0,209525	20,641281
199	-0,104730	20,641281
200	0,000000	20,641281
201	0,104730	20,641281
202	0,209525	20,641281
203	0,314447	20,641281
204	0,419561	20,641281
205	0,524932	20,641281
206	0,630625	20,641281
207	0,736707	20,641281
208	0.843245	20,641281
209	0,950307	20,641281
210	1,057962	20,641281

SEG, NO	ALPHA2	SEGLEN	BETA1	BETA2	BESL1	BESL2
1	1,57079637	0,12500000	-0,00000012	-0,00000012	-0,00000012	-0,00000012
2	1,57079637	0,12500000	-0,00000012	-0,00000012	-0,00000012	-0,00000012
3	1,57079637	0,12500000	-0,00000012	-0,00000012	-0,00000012	-0,00000012
4	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
5	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
6	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
7	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
8	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
9	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
10	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
11	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
12	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
13	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
14	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
15	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
16	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
17	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
18	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
19	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
20	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
21	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
22	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
23	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
24	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
25	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
26	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
27	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
28	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
29	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
30	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
31	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
32	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
33	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
34	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
35	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
36	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
37	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
38	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
39	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
40	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
41	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
42	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
43	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
44	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
45	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
46	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
47	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
48	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
49	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
50	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
51	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
52	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
53	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
54	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
55	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
56	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
57	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
58	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000

59	0,00000000	0,12500000	0,00000000	0,00000000	0,00000000	0,00000000
60	-1,57079637	0,12500000	0,00000012	0,00000012	0,00000012	0,00000012
61	-1,57079637	0,12500000	0,00000012	0,00000012	0,00000012	0,00000012
62	-1,57079637	0,12500000	0,00000012	0,00000012	0,00000012	0,00000012

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THIS TRIAL HAS     10  DIVISIONS

MATRIX A

G- MATRIX

H-1 MATRIX


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H-1 INVERSE MATRIX

H-INVERSE*G MATRIX

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OMEGA= 0,31415925E+06 MHARM= 0 WK= 0,53879271E+01
RHOWATER= 0,93880000E-04 CVEL= 0,58308000E+05 IRAD= 0

GRID NO	COMPLEX PRESSURE		ABSOLUTE PRESSURE
1	1,36458528	1,07362199	1,73630571
2	1,31300497	0,87537545	1,57805717
3	1,15552115	0,18601660	1,17039788
4	2,21181488	-0,73893350	2,33198357
5	3,40242672	-0,10305458	3,40398717
6	4,08217287	2,41609311	4,74358940
7	2,36158848	4,97328568	5,50551271
8	-1,26063156	5,80575752	5,94104528
9	-5,14209986	3,98903656	6,50796461
10	-7,28695154	-0,05608698	7,28716803
11	-6,35407352	-4,68098974	7,89214230
12	-2,39204001	-7,74158621	8,10271645
13	3,06812167	-7,62078762	8,21521568
14	7,63659716	-4,06069946	8,64909744
15	9,14071178	1,60552955	9,28064346
16	6,66375542	6,96440077	9,63890648
17	1,05482602	9,57300663	9,63094616
18	-5,35514498	8,08514786	9,69779301
19	-9,73723793	2,93234420	10,16919136
20	-10,02657795	-3,77673674	10,71428967
21	-5,89552641	-9,12789917	10,86626816
22	1,01839554	-10,67945480	10,72790241

23	7,76381016	-7,58169699	10,85167599
24	11,34496024	-1,02386701	11,39108753
25	10,05933857	6,21885967	11,82643318
26	4,30382299	10,96663284	11,78091431
27	-3,52972198	11,03845406	11,58906460
28	-10,05236053	6,25583649	11,83999348
29	-12,35068703	-1,41526520	12,43150997
30	-9,29171181	-8,67337418	12,71075630
31	-2,07449341	-12,30774784	12,48135281
32	6,23697602	-10,62348270	12,31902027
33	12,01837635	-4,23127174	12,74146938
34	12,66996479	4,16537619	13,33710480
35	7,78675604	10,91548252	13,40825558
36	-0,61296248	13,01232910	13,02675819
37	-8,92237854	9,43588448	12,98633003
38	-13,49842358	1,64564371	13,59836674
39	-12,26174831	-7,01258087	14,12539482
40	-5,64056063	-12,74566269	13,93799973
41	3,56962514	-12,97832584	13,46028042
42	11,38831425	-7,51224136	13,64285374
43	14,37324333	1,34318507	14,43586731
44	11,13686180	9,74525833	14,79864025
45	2,98726416	13,98713207	14,30257320
46	-6,60094070	12,13628960	13,81527901
47	-13,47147179	4,91741133	14,34090328
48	-14,59033775	-4,56379890	15,28745270
49	-9,38417149	-12,15423393	15,35539246
50	-0,02230382	-14,47316074	14,47317791
51	9,49274445	-10,42209911	14,09724617
52	15,04172134	-1,71116126	15,13874149
53	14,17099476	7,84925318	16,19962692
54	7,16408205	14,00235844	15,72863960
55	-3,06977367	13,93319035	14,26735020
56	-12,24795437	7,66545544	14,39612770
57	-16,56596756	-2,30794525	16,72596550
58	-14,33868408	-11,11007881	18,13923264
59	-6,70997190	-14,14825726	15,65876389
60	6,89397669	-11,03110981	13,00816250
61	10,36711884	2,84799981	10,75119877
62	12,98109913	8,24361801	15,37745667
63	13,81870937	10,09587097	17,11383438

PRESSURE AT EXTERIOR PTS, DUE TO SURFACE VEL,DISTR,

64	-0,07655390	0,03585042	0,08453254
65	-0,07641251	-0,02992349	0,08206271
66	-0,07700644	-0,09700228	0,12385247
67	-0,07584513	-0,15988824	0,17696534
68	-0,07023931	-0,21337180	0,22463545
69	-0,05786233	-0,25284445	0,25938073
70	-0,03726602	-0,27455711	0,27707466
71	-0,00828945	-0,27584460	0,27596912
72	0,02769930	-0,25532687	0,25682497
73	0,06776933	-0,21310003	0,22361642
74	0,10761905	-0,15089694	0,18534224
75	0,14199844	-0,07220059	0,15929997
76	0,16533290	0,01773616	0,16628151
77	0,17250027	0,11200962	0,20567572
78	0,15968604	0,20237720	0,25779092
79	0,12521534	0,27979779	0,30653822
80	0,07023793	0,33521888	0,34249824

81	-0,00085939	0,36058083	0,36058187
82	-0,08043998	0,34998077	0,35910603
83	-0,15810826	0,30085486	0,33987036
84	-0,22175480	0,21501955	0,30888283
85	0,02127003	-0,06293060	0,06642797
86	0,02077491	-0,06495861	0,06819984
87	0,02023126	-0,06573182	0,06877481
88	0,01973019	-0,06523132	0,06814987
89	0,01933602	-0,06346270	0,06634302
90	0,01908477	-0,06045286	0,06339382
91	0,01898352	-0,05624809	0,05936516
92	0,01901121	-0,05091131	0,05434508
93	0,01912017	-0,04452167	0,04845368
94	0,01923973	-0,03717516	0,04185881
95	0,01927747	-0,02898190	0,03480764
96	0,01912468	-0,02006981	0,02772275
97	0,01866226	-0,01058387	0,02145456
98	0,01776362	-0,00068749	0,01777692
99	0,01630340	0,00943674	0,01883754
100	0,01416363	0,01958548	0,02417022
101	0,01124122	0,02953642	0,03160325
102	0,00745748	0,03904806	0,03975380
103	0,00276484	0,04786297	0,04794276
104	-0,00284211	0,05571087	0,05578332
105	-0,00931985	0,06231629	0,06300937
106	-0,07865032	-0,00103840	0,07865717
107	-0,05433703	-0,06013658	0,08104888
108	-0,03045069	-0,12021083	0,12400762
109	-0,00671580	-0,17552073	0,17564917
110	0,01741766	-0,22055463	0,22124131
111	0,04239100	-0,25049171	0,25405335
112	0,06817511	-0,26159775	0,27033541
113	0,09399480	-0,25155041	0,26853794
114	0,11818857	-0,21969111	0,24946488
115	0,13824616	-0,16719161	0,21694477
116	0,15103132	-0,09712376	0,17956471
117	0,15318355	-0,01440728	0,15385957
118	0,14166448	0,07438676	0,16000693
119	0,11439022	0,16140583	0,19783065
120	0,07086489	0,23807256	0,24839561
121	0,01272226	0,29583430	0,29610771
122	-0,05594120	0,32707477	0,33182421
123	-0,12853664	0,32612678	0,35054293
124	-0,19635165	0,29028928	0,35045949
125	-0,24935885	0,22070430	0,33300185
126	-0,27745959	0,12292967	0,30347246
127	-0,05666562	-0,02666537	0,06262615
128	-0,05800975	-0,02615179	0,06363212
129	-0,05829700	-0,02551626	0,06363662
130	-0,05751698	-0,02482707	0,06264653
131	-0,05567839	-0,02413323	0,06068357
132	-0,05280794	-0,02346300	0,05778574
133	-0,04894729	-0,02282258	0,05400655
134	-0,04415362	-0,02219878	0,04941991
135	-0,03849673	-0,02155807	0,04412197
136	-0,03205942	-0,02085179	0,03824400
137	-0,02493768	-0,02001480	0,03197625
138	-0,01724053	-0,01897151	0,02563501
139	-0,00909045	-0,01763769	0,01984249
140	-0,00062403	-0,01592677	0,01593900
141	0,00800706	-0,01375100	0,01591236

142	0,01663726	-0,01102954	0,01996119
143	0,02508617	-0,00769365	0,02623944
144	0,03316012	-0,00369084	0,03336488
145	0,04065423	0,00100621	0,04066668
146	0,04735393	0,00639571	0,04778389
147	0,05304192	0,01243900	0,05448095
148	0,05536884	-0,00929652	0,05614387
149	0,07131205	0,04125870	0,08238744
150	0,08743732	0,08990102	0,12540925
151	0,10068331	0,13370717	0,16737603
152	0,10809112	0,17013296	0,20156616
153	0,10719655	0,19704121	0,22431305
154	0,09636860	0,21270536	0,23351760
155	0,07506225	0,21581814	0,22849903
156	0,04397412	0,20553128	0,21018265
157	0,00507473	0,18153240	0,18160331
158	-0,03848296	0,14416185	0,14920984
159	-0,08258666	0,09455486	0,12554353
160	-0,12250967	0,03478660	0,12735277
161	-0,15337133	-0,03201868	0,15667789
162	-0,17067999	-0,10165455	0,19865878
163	-0,17092223	-0,16891707	0,24030687
164	-0,15214820	-0,22785062	0,27397987
165	-0,11447779	-0,27217108	0,29526645
166	-0,06045493	-0,29587734	0,30199039
167	0,00483607	-0,29401436	0,29405415
168	0,07397118	-0,26353234	0,27371705
169	0,05197532	-0,02174846	0,05634208
170	0,05173996	-0,02261125	0,05646496
171	0,05093239	-0,02290770	0,05584685
172	0,04958932	-0,02261344	0,05450200
173	0,04774357	-0,02172121	0,05245245
174	0,04542504	-0,02024070	0,04973047
175	0,04265834	-0,01819826	0,04637790
176	0,03946230	-0,01563404	0,04244640
177	0,03585349	-0,01260420	0,03800445
178	0,03184275	-0,00917647	0,03313862
179	0,02744052	-0,00543052	0,02797271
180	0,02265494	-0,00145773	0,02270179
181	0,01749606	0,00264131	0,01769431
182	0,01197752	0,00675730	0,01375217
183	0,00611831	0,01077360	0,01238968
184	-0,00005458	0,01456797	0,01456807
185	-0,00650309	0,01801511	0,01915292
186	-0,01317676	0,02098847	0,02478191
187	-0,02000716	0,02336310	0,03075907
188	-0,02691019	0,02501999	0,03674450
189	-0,03377961	0,02585045	0,04253596
190	0,01519259	-0,05708520	0,05907228
191	0,04420315	-0,08110055	0,09236459
192	0,07020523	-0,10322317	0,12483507
193	0,09252188	-0,12103470	0,15234728
194	0,11068001	-0,13241582	0,17258045
195	0,12431707	-0,13571639	0,18404803
196	0,13309358	-0,12988673	0,18596898
197	0,13663517	-0,11457154	0,17831379
198	0,13451353	-0,09016053	0,16193460
199	0,12626979	-0,05779855	0,13886948
200	0,11148574	-0,01935380	0,11315317
201	0,08989293	0,02266219	0,09270552
202	0,06151166	0,06522074	0,08965171

203	0,02680308	0,10495579	0,10832416
204	-0,01318644	0,13839272	0,13901952
205	-0,05671438	0,16222449	0,17185257
206	-0,10129284	0,17362621	0,20101318
207	-0,14371940	0,17058854	0,22305989
208	-0,18022327	0,15224707	0,23592287
209	-0,20672615	0,11916353	0,23861191
210	-0,21923473	0,07352890	0,23123661
211	-0,02350581	0,04492765	0,05070520
212	-0,02266026	0,04492781	0,05031894
213	-0,02178546	0,04431009	0,04937601
214	-0,02091072	0,04308542	0,04789166
215	-0,02005379	0,04127191	0,04588600
216	-0,01922367	0,03889302	0,04338452
217	-0,01841907	0,03597880	0,04041951
218	-0,01762968	0,03256276	0,03702889
219	-0,01683674	0,02868442	0,03326066
220	-0,01601348	0,02438681	0,02917445
221	-0,01512843	0,01971792	0,02485288
222	-0,01414240	0,01473064	0,02042056
223	-0,01301409	0,00948314	0,01610269
224	-0,01169866	0,00403847	0,01237610
225	-0,01015092	-0,00153319	0,01026606
226	-0,00832678	-0,00715674	0,01097972
227	-0,00618494	-0,01274955	0,01417055
228	-0,00368904	-0,01822185	0,01859152
229	-0,00081124	-0,02347850	0,02349251
230	0,00246700	-0,02841717	0,02852406
231	0,00615056	-0,03293029	0,03349975
232	0,00643555	-0,07399057	0,07426992
233	0,01364363	-0,09679441	0,09775125
234	0,01957915	-0,11611877	0,11775785
235	0,02478359	-0,13076220	0,13309012
236	0,02975351	-0,13978018	0,14291176
237	0,03485691	-0,14250818	0,14670919
238	0,04027184	-0,13857254	0,14430583
239	0,04594630	-0,12789690	0,13589953
240	0,05158575	-0,11070257	0,12213170
241	0,05666492	-0,08751094	0,10425486
242	0,06046682	-0,05914366	0,08458255
243	0,06214717	-0,02671689	0,06764661
244	0,06082007	0,00836893	0,06139315
245	0,05565964	0,04445338	0,07123271
246	0,04601684	0,07965570	0,09199228
247	0,03153702	0,11193717	0,11629495
248	0,01227241	0,13919264	0,13973261
249	-0,01121973	0,15937090	0,15976535
250	-0,03781509	0,17062430	0,17476451
251	-0,06580094	0,17148641	0,18367732
252	-0,09291531	0,16106407	0,18594325
253	-0,00455133	-0,04552837	0,04575530
254	-0,00511378	-0,04479137	0,04508235
255	-0,00541128	-0,04365083	0,04398496
256	-0,00543486	-0,04212775	0,04247688
257	-0,00516513	-0,04024174	0,04057442
258	-0,00467022	-0,03801314	0,03829895
259	-0,00390549	-0,03546004	0,03567446
260	-0,00291353	-0,03259942	0,03272936
261	-0,00172345	-0,02944763	0,02949801
262	-0,00037012	-0,02602017	0,02602280
263	0.00110644	-0,02233251	0.02235990

264	0,00266128	-0,01840051	0,01859197
265	0,00424463	-0,01424106	0,01486017
266	0,00580389	-0,00987293	0,01145250
267	0,00728285	-0,00531802	0,00901783
268	0,00862310	-0,00060155	0,00864405
269	0,00976553	0,00424579	0,01064858
270	0,01064933	0,00918888	0,01406569
271	0,01121635	0,01418482	0,01808358
272	0,01140964	0,01918372	0,02232028
273	0,01117640	0,02412750	0,02659038

TOTAL ACOUSTIC PRESSURE ON EXTERIOR POINTS

-0,44297758E+00	0,41154254E-01	0,44488516E+00
-0,55694503E+00	0,10946593E+00	0,56760073E+00
-0,61993623E+00	0,17521587E+00	0,64422166E+00
-0,62709004E+00	0,22504804E+00	0,66624957E+00
-0,57886046E+00	0,24843289E+00	0,62991929E+00
-0,48039335E+00	0,23910017E+00	0,53660661E+00
-0,34062147E+00	0,19578914E+00	0,39288214E+00
-0,17125425E+00	0,12228552E+00	0,21043234E+00
0,14223370E-01	0,26801480E-01	0,30341780E-01
0,20146169E+00	-0,79207405E-01	0,21647315E+00
0,37606078E+00	-0,18262082E+00	0,41805750E+00
0,52429169E+00	-0,27044594E+00	0,58993459E+00
0,63378376E+00	-0,33160317E+00	0,71529192E+00
0,69422096E+00	-0,35851991E+00	0,78133166E+00
0,69808465E+00	-0,34831116E+00	0,78015566E+00
0,64144552E+00	-0,30339527E+00	0,70957804E+00
0,52474153E+00	-0,23141268E+00	0,57350278E+00
0,35345212E+00	-0,14439607E+00	0,38180965E+00
0,13850139E+00	-0,57196457E-01	0,14984682E+00
-0,10379251E+00	0,14701245E-01	0,10482849E+00
-0,35240892E+00	0,57757620E-01	0,35711059E+00
-0,17617083E+00	0,98750092E-01	0,20195976E+00
-0,14140330E+00	0,11001428E+00	0,17915924E+00
-0,10375056E+00	0,11623134E+00	0,15580085E+00
-0,64209580E-01	0,11756563E+00	0,13395727E+00
-0,23712236E-01	0,11435070E+00	0,11678335E+00
0,16889365E-01	0,10705944E+00	0,10838346E+00
0,56828912E-01	0,96268468E-01	0,11179062E+00
0,95428869E-01	0,82630262E-01	0,12623166E+00
0,13209522E+00	0,66841461E-01	0,14804366E+00
0,16631526E+00	0,49614161E-01	0,17355785E+00
0,19764572E+00	0,31653542E-01	0,20016436E+00
0,22570539E+00	0,13632350E-01	0,22611670E+00
0,25016773E+00	-0,38281996E-02	0,25019702E+00
0,27074721E+00	-0,20181349E-01	0,27149832E+00
0,28719661E+00	-0,34964535E-01	0,28931716E+00
0,29930136E+00	-0,47823325E-01	0,30309796E+00
0,30687585E+00	-0,58516182E-01	0,31240508E+00
0,30976683E+00	-0,66928923E-01	0,31691477E+00
0,30785456E+00	-0,73083147E-01	0,31641045E+00
0,30106717E+00	-0,77136166E-01	0,31079164E+00
0,28938839E+00	-0,79387233E-01	0,30007994E+00
-0,43429226E+00	-0,12931532E+00	0,45313600E+00
-0,55869716E+00	-0,10579959E+00	0,56862652E+00
-0,63523471E+00	-0,66586219E-01	0,63871503E+00
-0,65528780E+00	-0,22088857E-01	0,65566003E+00
-0,61599123E+00	0,18023444E-01	0,61625487E+00
-0,52012616E+00	0,46292149E-01	0,52218217E+00

-0,37553632E+00	0,58423311E-01	0,38005370E+00
-0,19421953E+00	0,53656787E-01	0,20149510E+00
0,87854359E-02	0,34545466E-01	0,35645101E-01
0,21661861E+00	0,62216483E-02	0,21670793E+00
0,41185570E+00	-0,24711702E-01	0,41259637E+00
0,57775152E+00	-0,51506836E-01	0,58004296E+00
0,69944817E+00	-0,68606421E-01	0,70280474E+00
0,76511633E+00	-0,72797768E-01	0,76857167E+00
0,76700509E+00	-0,64011350E-01	0,76967150E+00
0,70233858E+00	-0,45597501E-01	0,70381719E+00
0,57397676E+00	-0,24018178E-01	0,57447904E+00
0,39073157E+00	-0,79107611E-02	0,39081165E+00
0,16721170E+00	-0,65976558E-02	0,16734180E+00
-0,76933570E-01	-0,28204773E-01	0,81940733E-01
-0,31845394E+00	-0,77631682E-01	0,32777977E+00
0,83891243E-01	0,15890056E+00	0,17968619E+00
0,95866531E-01	0,12715559E+00	0,15924489E+00
0,10366920E+00	0,92934474E-01	0,13922687E+00
0,10742632E+00	0,57064589E-01	0,12164202E+00
0,10739514E+00	0,20323858E-01	0,10930131E+00
0,10393693E+00	-0,16576383E-01	0,10525046E+00
0,97494110E-01	-0,52986275E-01	0,11096238E+00
0,88565625E-01	-0,88328466E-01	0,12508312E+00
0,77684499E-01	-0,12208926E+00	0,14470890E+00
0,65397881E-01	-0,15381962E+00	0,16714472E+00
0,52247122E-01	-0,18312660E+00	0,19043402E+00
0,38751986E-01	-0,20966773E+00	0,21321882E+00
0,25392288E-01	-0,23314494E+00	0,23452361E+00
0,12596275E-01	-0,25329927E+00	0,25361228E+00
0,72662672E-03	-0,26990440E+00	0,26990539E+00
-0,99313529E-02	-0,28276306E+00	0,28293741E+00
-0,19176776E-01	-0,29170999E+00	0,29233965E+00
-0,26905710E-01	-0,29660583E+00	0,29782367E+00
-0,33111829E-01	-0,29734635E+00	0,29918429E+00
-0,37896018E-01	-0,29386547E+00	0,29629886E+00
-0,41462228E-01	-0,28614596E+00	0,28913426E+00
0,43950027E+00	-0,20970321E+00	0,48696604E+00
0,48034951E+00	-0,29437506E+00	0,56337589E+00
0,48121607E+00	-0,35733190E+00	0,59937888E+00
0,44492346E+00	-0,38886929E+00	0,59091133E+00
0,37682819E+00	-0,38309580E+00	0,53736573E+00
0,28390777E+00	-0,33842412E+00	0,44174030E+00
0,17391768E+00	-0,25758204E+00	0,31079876E+00
0,54714970E-01	-0,14720137E+00	0,15704131E+00
-0,66200338E-01	-0,17052820E-01	0,68361416E-01
-0,18193470E+00	0,12097619E+00	0,21848449E+00
-0,28626558E+00	0,25406760E+00	0,38275102E+00
-0,37359509E+00	0,36972913E+00	0,52561677E+00
-0,43886083E+00	0,45701814E+00	0,63361216E+00
-0,47749799E+00	0,50765115E+00	0,69693190E+00
-0,48551485E+00	0,51690203E+00	0,70916313E+00
-0,45973405E+00	0,48420841E+00	0,66769242E+00
-0,39821506E+00	0,41341263E+00	0,57400805E+00
-0,30082440E+00	0,31256989E+00	0,43381476E+00
-0,16988285E+00	0,19328929E+00	0,25733429E+00
-0,10770833E-01	0,69600776E-01	0,70429243E-01
0,16765456E+00	-0,43602992E-01	0,17323184E+00
-0,14776832E+00	-0,13850066E-01	0,14841597E+00
-0,13175705E+00	0,11069026E-01	0,13222118E+00
-0,11250319E+00	0,34401394E-01	0,11764534E+00
-0,90563111E-01	0,55893660E-01	0,10642264E+00

-0,66509984E-01	0,75384088E-01	0,10053029E+00
-0,40913627E-01	0,92788011E-01	0,10140779E+00
-0,14334991E-01	0,10808858E+00	0,10903500E+00
0,12684168E-01	0,12132606E+00	0,12198730E+00
0,39629117E-01	0,13258009E+00	0,13837612E+00
0,66015273E-01	0,14196385E+00	0,15656230E+00
0,91391847E-01	0,14960773E+00	0,17531385E+00
0,11534710E+00	0,15565200E+00	0,19373307E+00
0,13750748E+00	0,16023391E+00	0,21114738E+00
0,15754239E+00	0,16348040E+00	0,22703622E+00
0,17516138E+00	0,16549735E+00	0,24097900E+00
0,19012403E+00	0,16636643E+00	0,25263599E+00
0,20223527E+00	0,16613406E+00	0,26172432E+00
0,21135215E+00	0,16481553E+00	0,26801845E+00
0,21738775E+00	0,16238230E+00	0,27134007E+00
0,22031365E+00	0,15877046E+00	0,27156246E+00
0,22016697E+00	0,15387547E+00	0,26860967E+00
-0,38534608E+00	-0,30968532E+00	0,49436486E+00
-0,44047672E+00	-0,28338930E+00	0,52376449E+00
-0,46404248E+00	-0,23909803E+00	0,52201849E+00
-0,45303768E+00	-0,18279733E+00	0,48852634E+00
-0,40745386E+00	-0,12037154E+00	0,42486227E+00
-0,33007318E+00	-0,57021059E-01	0,33496225E+00
-0,22608657E+00	0,31206962E-02	0,22610810E+00
-0,10258818E+00	0,57157800E-01	0,11743657E+00
0,31999692E-01	0,10341589E+00	0,10825352E+00
0,16853081E+00	0,14125122E+00	0,21989666E+00
0,29773983E+00	0,17075244E+00	0,34322789E+00
0,41083413E+00	0,19236498E+00	0,45363969E+00
0,50003552E+00	0,20651430E+00	0,54100245E+00
0,55908585E+00	0,21327405E+00	0,59838349E+00
0,58368099E+00	0,21212776E+00	0,62103277E+00
0,57182759E+00	0,20187789E+00	0,60641688E+00
0,52409291E+00	0,18071406E+00	0,55437440E+00
0,44372872E+00	0,14646758E+00	0,46727711E+00
0,33661538E+00	0,97026944E-01	0,35032007E+00
0,21101663E+00	0,30890379E-01	0,21326564E+00
0,77091284E-01	-0,52208055E-01	0,93106113E-01
0,91254078E-01	-0,85690908E-01	0,12518083E+00
0,66133112E-01	-0,91584042E-01	0,11296560E+00
0,40232968E-01	-0,94835795E-01	0,10301708E+00
0,13972820E-01	-0,95624454E-01	0,96639931E-01
-0,12266731E-01	-0,94174154E-01	0,94969705E-01
-0,38148679E-01	-0,90743102E-01	0,98435931E-01
-0,63373253E-01	-0,85613146E-01	0,10651657E+00
-0,87680832E-01	-0,79080597E-01	0,11807485E+00
-0,11084238E+00	-0,71448050E-01	0,13187440E+00
-0,13266204E+00	-0,63016258E-01	0,14686818E+00
-0,15297063E+00	-0,54078054E-01	0,16224810E+00
-0,17161952E+00	-0,44910651E-01	0,17739849E+00
-0,18848240E+00	-0,35772756E-01	0,19184709E+00
-0,20344527E+00	-0,26897056E-01	0,20521556E+00
-0,21640763E+00	-0,18488076E-01	0,21719593E+00
-0,22728261E+00	-0,10715693E-01	0,22753508E+00
-0,23598744E+00	-0,37123263E-02	0,23601665E+00
-0,24245010E+00	0,24292639E-02	0,24246228E+00
-0,24660580E+00	0,76604816E-02	0.24672477E+00
-0,24840121E+00	0,11979139E-01	0,24868989E+00
-0,24779265E+00	0,15432278E-01	0,24827275E+00
-0,45481992E+00	-0,16127683E-01	0,45510575E+00
-0,44974375E+00	0,32066476E-01	0,45088544E+00

-0,41908219E+00	0,74267484E-01	0,42561197E+00
-0,36516204E+00	0,10664892E+00	0,38041729E+00
-0,29145756E+00	0,12670507E+00	0,31780761E+00
-0,20225550E+00	0,13333258E+00	0,24224959E+00
-0,10233780E+00	0,12677482E+00	0,16292599E+00
0,32923026E-02	0,10846397E+00	0,10851393E+00
0,10963734E+00	0,80785304E-01	0,13618596E+00
0,21188590E+00	0,46785019E-01	0,21698959E+00
0,30554074E+00	0,98461248E-02	0,30569932E+00
0,38652590E+00	-0,26646907E-01	0,38744330E+00
0,45126435E+00	-0,59625868E-01	0,45518655E+00
0,49675474E+00	-0,86626098E-01	0,50425130E+00
0,52064812E+00	-0,10602406E+00	0,53133380E+00
0,52134168E+00	-0,11720297E+00	0,53435349E+00
0,49808633E+00	-0,12063804E+00	0,51248759E+00
0,45110309E+00	-0,11788947E+00	0,46625310E+00
0,38171154E+00	-0,11147950E+00	0,39765736E+00
0,29243407E+00	-0,10466953E+00	0,31060165E+00
0,18706162E+00	-0,10113193E+00	0,21264927E+00
-0,89730304E-02	0,10770953E+00	0,10808264E+00
0,11633608E-01	0,98640434E-01	0,99324092E-01
0,31372257E-01	0,87606959E-01	0,93054816E-01
0,50087240E-01	0,74917726E-01	0,90118796E-01
0,67663871E-01	0,60886387E-01	0,91025010E-01
0,84024683E-01	0,45822166E-01	0,95706940E-01
0,99124014E-01	0,30029286E-01	0,10357281E+00
0,11294417E+00	0,13801698E-01	0,11378432E+00
0,12548585E+00	-0,25780646E-02	0,12551233E+00
0,13676819E+00	-0,18846130E-01	0,13806055E+00
0,14681983E+00	-0,34752604E-01	0,15087679E+00
0,15567723E+00	-0,50067756E-01	0,16353036E+00
0,16337846E+00	-0,64579815E-01	0,17567889E+00
0,16996080E+00	-0,78099377E-01	0,18704595E+00
0,17545445E+00	-0,90456493E-01	0,19739971E+00
0,17988494E+00	-0,10150729E+00	0,20654859E+00
0,18326546E+00	-0,11112931E+00	0,21432675E+00
0,18559691E+00	-0,11922631E+00	0,22059268E+00
0,18686667E+00	-0,12572858E+00	0,22522618E+00
0,18704949E+00	-0,13059725E+00	0,22812970E+00
0,18610336E+00	-0,13382289E+00	0,22922266E+00

TRANSDUCER IS AT 6,75 IN, FROM SURFACE AND STRING OF HYDROPHONES ARE LOCATED AT 6,00 IN, HOR, AND AT A DEPTH OF 6,75

FOLLOWING THREE SETS OF RESULTS ARE PRESSURES AND THE ABSOLUTE MAGNITUDES DUE TO LOWER TRANSDUCER
-VE UPPER TRANSDUCER & THE SUM OF ABOVE TWO SETS, THE LAST COLUMN =20,*LOG(ABS(PRESSURE))

TRANSDUCER

Re(p)	Im(p)	|p|	20 log(|p|)
-0,44297758	0,04115425	0,44488516	-7,03504133
-0,55694503	0,10946593	0,56760073	-4,91914129
-0,61993623	0,17521587	0,64422166	-3,81929350
-0,62709004	0,22504804	0,66624957	-3,52726126
-0,57886046	0,24843289	0,62991929	-4,01430178
-0,48039335	0,23910017	0,53660661	-5,40687990
-0,34062147	0,19578914	0,39288214	-8,11475372
-0,17125425	0,12228552	0,21043234	-13,53775024
0,01422337	0,02680148	0,03034178	-30,35918045
0,20146169	-0,07920741	0,21647315	-13,29192066
0,37606078	-0,18262082	0,41805750	-7,57528019
0,52429169	-0,27044594	0,58993459	-4,58392334
0,63378376	-0,33160317	0,71529192	-2,91033363
0,69422096	-0,35851991	0,78133166	-2,14329147
0,69808465	-0,34831116	0,78015566	-2,15637493
0,64144552	-0,30339527	0,70957804	-2,97999692
0,52474153	-0,23141268	0,57350278	-4,82928944
0,35345212	-0,14439607	0,38180965	-8,36306190
0,13850139	-0,05719646	0,14984682	-16,48705101
-0,10379251	0,01470125	0,10482849	-19,59041405
-0,35240892	0,05775762	0,35711059	-8,94394588

********************************** IMAGE TRANSDUCER

0,17617083	-0,09875009	0,20195976	-13,89470387
0,14140330	-0,11001428	0,17915924	-14,93521595
0,10375056	-0,11623134	0,15580085	-16,14860344
0,06420958	-0,11756563	0,13395727	-17,46067429
0,02371224	-0,11435070	0,11678335	-18,65238190
-0,01688937	-0,10705944	0,10838346	-19,30073929
-0,05682891	-0,09626847	0,11179062	-19,03189278
-0,09542887	-0,08263026	0,12623166	-17,97663498
-0,13209522	-0,06684146	0,14804366	-16,59220505
-0,16631526	-0,04961416	0,17355785	-15,21111488
-0,19764572	-0,03165354	0,20016436	-13,97226620
-0,22570539	-0,01363235	0,22611670	-12,91334724
-0,25016773	0,00382820	0,25019702	-12,03435802
-0,27074721	0,02018135	0,27149832	-11,32465744
-0,28719661	0,03496454	0,28931716	-10,77251720
-0,29930136	0,04782332	0,30309796	-10,36834049
-0,30687585	0,05851618	0,31240508	-10,10563850
-0,30976683	0,06692892	0,31691477	-9,98115158
-0,30785456	0,07308315	0,31641045	-9,99498367
-0,30106717	0,07713617	0,31079164	-10,15061378
-0,28938839	0,07938723	0,30007994	-10,45526123

********************************** ACOUSTIC PRESSURE AT HYDROPHONES IN SEMI INFINITE MEDIUM. (SUM OF ABOVE TWO SETS)

-0,26680675	-0,05759584	0,27295259	-11,27825642
-0,41554174	-0,00054836	0,41554213	-7,62769890
-0,51618570	0,05898453	0,51954484	-5,68753958
-0,56288046	0,10748240	0,57305050	-4,83614206
-0,55514824	0,13408220	0,57111084	-4,86559200
-0,49728271	0,13204074	0,51451421	-5,77205324
-0,39745039	0,09952068	0,40972034	-7,75023890

-0,26668313	0,03965526	0,26961532	-11,38510990
-0,11787185	-0,04003998	0,12448683	-18,09753036
0,03514643	-0,12882157	0,13353004	-17,48842239
0,17841506	-0,21427436	0,27882871	-11,09325027
0,29858631	-0,28407830	0,41213378	-7,69923592
0,38361603	-0,32777497	0,50457674	-5,94145536
0,42347375	-0,33833855	0,54203600	-5,31943798
0,41088805	-0,31334662	0,51673502	-5,73464203
0,34214416	-0,25557196	0,42705929	-7,39023638
0,21786568	-0,17289650	0,27813423	-11,11491108
0,04368529	-0,07746714	0,08893573	-21,01847458
-0,16935317	0,01588669	0,17009670	-15,38608360
-0,40485969	0,09183741	0,41514513	-7,63600111
-0,64179730	0,13714485	0,65628690	-3,65812540

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SUM OF ABSOLUTE PRESSURES AT 21 POINTS/21,DUE TO TRANSDUCER BELOW SURFACE IS (PT1=) 0,38774249
DB=20,*LOG(PT1)= -8,22913265

THESE RESULTS=AVE, DB=20,*(SUM OFLOG(P(J)*D/R(J)) = -9,321827

D=6" location of transducer string
R(J), J=1,21 location of j^th transducer of the string.

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TM No. 841087

TRANSDUCER IS AT 6,75 IN, FROM SURFACE AND STRING OF HYDROPHONES ARE LOCATED AT 6.00 IN, HOR, AND AT A DEPTH OF 7,75

FOLLOWING THREE SETS OF RESULTS ARE PRESSURES AND THE ABSOLUTE MAGNITUDES DUE TO LOWER TRANSDUCER
-VE UPPER TRANSDUCER & THE SUM OF ABOVE TWO SETS, THE LAST COLUMN =20,*LOG(ABS(PRESSURE))

-0,43429226	-0,12931532	0,45313600	-6,87542868
-0,55869716	-0,10579959	0,56862652	-4,90345812
-0,63523471	-0,06658622	0,63871503	-3,89385724
-0,65528780	-0,02208886	0,65566003	-3,66642594
-0,61599123	0,01802344	0,61625487	-4,20479250
-0,52012616	0,04629215	0,52218217	-5,64355993
-0,37553632	0,05842331	0,38005370	-8,40310097
-0,19421953	0,05365679	0,20149510	-13,91471004
0,00878544	0,03454547	0,03564510	-28,96000481
0,21661861	0,00622165	0,21670793	-13,28250408
0,41185570	-0,02471170	0,41259637	-7,68949175
0,57775152	-0,05150684	0,58004296	-4,73079729
0,69944817	-0,06860642	0,70280474	-3,06330657
0,76511633	-0,07279777	0,76857167	-2,28631234
0,76700509	-0,06401135	0,76967150	-2,27389193
0,70233858	-0,04559750	0,70381719	-3,05080271
0,57397676	-0,02401818	0,57447904	-4,81451654
0,39073157	-0,00791076	0,39081165	-8,16065025
0,16721170	-0,00659766	0,16734180	-15,52791119
-0,07693357	-0,02820477	0,08194073	-21,73000336
-0,31845394	-0,07763168	0,32777977	-9,68835735

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-0,08389124	-0,15890056	0,17968619	-14,90970612
-0,09586653	-0,12715559	0,15924489	-15,95869064
-0,10366920	-0,09293447	0,13922685	-17,12553978
-0,10742632	-0,05706459	0,12164203	-18,29832840
-0,10739514	-0,02032386	0,10930131	-19,22749329
-0,10393693	0,01657638	0,10525047	-19,55551910
-0,09749411	0,05298628	0,11096238	-19,09648514
-0,08856563	0,08832847	0,12508312	-18,05602646
-0,07768450	0,12208926	0,14470890	-16,79009628
-0,06539788	0,15381962	0,16714472	-15,53814697
-0,05224712	0,18312660	0,19043402	-14,40511036
-0,03875199	0,20966773	0,21321882	-13,42348957
-0,02539229	0,23314494	0,23452361	-12,59626865
-0,01259627	0,25329927	0,25361228	-11,91659451
-0,00072663	0,26990440	0,26990539	-11,37576962
0,00993135	0,28276306	0,28293741	-10,96619415
0,01917678	0,29170999	0,29233965	-10,68224525
0,02690571	0,29660583	0,29782367	-10,52081585
0,03311183	0,29734635	0,29918429	-10,48122501
0,03789602	0,29386547	0,29629886	-10,56540012
0,04146223	0,28614596	0,28913426	-10,77801037

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-0,51818353	-0,28821588	0,59294403	-4,53972578
-0,65456372	-0,23295519	0,69478184	-3,16303086
-0,73890394	-0,15952070	0,75592721	-2,43040061
-0,76271415	-0,07915345	0,76681042	-2,30624008
-0,72338641	-0,00230041	0,72339010	-2,81254888
-0,62406307	0,06286854	0,62722176	-4,05157757
-0,47303045	0,11140959	0,48597315	-6,26775455

TM No. 841087

-0,28278515	0,14198525	0,31642893	-9,99447632
-0,06889907	0,15663473	0,17111844	-15,33406353
0,15122074	0,16004127	0,22018383	-13,14429188
0,35960859	0,15841490	0,39295498	-8,11314392
0,53899956	0,15816090	0,56172532	-5,00952005
0,67405587	0,16453852	0,69384748	-3,17471981
0,75252008	0,18050151	0,77386516	-2,22669435
0,76627845	0,20589305	0,79345733	-2,00952864
0,71226990	0,23716557	0,75071692	-2,49047589
0,59315354	0,26769182	0,65076113	-3,73156810
0,41763729	0,28869507	0,50770640	-5,88774729
0,20032352	0,29074869	0,35307834	-9,04257870
-0,03903755	0,26566070	0,26851356	-11,42067719
-0,27699172	0,20851427	0,34670249	-9,20086193

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SUM OF ABSOLUTE PRESSURES AT 21 POINTS/21,DUE TO TRANSDUCER BELOW SURFACE IS 0,55572462
DB=20,*LOG(PT1)= -5,10280752

THESE RESULTS=AVE, DB=20,*(SUM OFLOG(P(J)/R(J)) = -5,850384

TRANSDUCER IS AT 6,75 IN, FROM SURFACE AND STRING OF HYDROPHONES ARE LOCATED AT 6,00 IN. HOR. AND AT A DEPTH OF 9,50

FOLLOWING THREE SETS OF RESULTS ARE PRESSURES AND THE ABSOLUTE MAGNITUDES DUE TO LOWER TRANSDUCER
-VE UPPER TRANSDUCER & THE SUM OF ABOVE TWO SETS, THE LAST COLUMN =20,*LOG(ABS(PRESSURE))

0,43950027	-0,20970321	0,48696604	-6,25002623
0,48034951	-0,29437506	0,56337589	-4,98403502
0,48121607	-0,35733190	0,59937888	-4,44597149
0,44492346	-0,38886929	0,59091133	-4,56955385
0,37682819	-0,38309580	0,53736573	-5,39460087
0,28390777	-0,33842412	0,44174030	-7,09665966
0,17391768	-0,25758204	0,31079876	-10,15041447
0,05471497	-0,14720137	0,15704131	-16,07972145
-0,06620034	-0,01705282	0,06836142	-23,30377769
-0,18193470	0,12097619	0,21848449	-13,21158791
-0,28626558	0,25406760	0,38275102	-8,34167290
-0,37359509	0,36972913	0,52561677	-5,58661652
-0,43886083	0,45701814	0,63361216	-3,96353006
-0,47749799	0,50765115	0,69693190	-3,13619351
-0,48551485	0,51690203	0,70916313	-2,98507690
-0,45973405	0,48420841	0,66769242	-3,50847125
-0,39821506	0,41341263	0,57400805	-4,82164049
-0,30082440	0,31256989	0,43381476	-7,25391388
-0,16988285	0,19328929	0,25733429	-11,79004669
-0,01077083	0,06960078	0,07042924	-23,04494095
0,16765456	-0,04360299	0,17323184	-15,22744656

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0,14776832	0,01385007	0,14841597	-16,57038689
0,13175705	-0,01106903	0,13222118	-17,57398033
0,11250319	-0,03440139	0,11764534	-18,58850479
0,09056311	-0,05589366	0,10642264	-19,45932007
0,06650998	-0,07538409	0,10053029	-19,95406342
0,04091363	-0,09278801	0,10140779	-19,87857437
0,01433499	-0,10808858	0,10903501	-19,24868202
-0,01268417	-0,12132606	0,12198730	-18,27370834
-0,03962912	-0,13258009	0,13837612	-17,17877769
-0,06601527	-0,14196385	0,15656230	-16,10625839
-0,09139185	-0,14960773	0,17531385	-15,12367630
-0,11534710	-0,15565200	0,19373307	-14,25592518
-0,13750748	-0,16023391	0,21114738	-13,50828648
-0,15754239	-0,16348040	0,22703622	-12,87809753
-0,17516138	-0,16549735	0,24097900	-12,36041641
-0,19012403	-0,16636643	0,25263599	-11,95009613
-0,20223527	-0,16613406	0,26172432	-11,64311886
-0,21135215	-0,16481553	0,26801845	-11,43670559
-0,21738775	-0,16238230	0,27134007	-11,32972145
-0,22031365	-0,15877046	0,27156246	-11,32260609
-0,22016697	-0,15387547	0,26860967	-11,41756821

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0,58726859	-0,19585314	0,61906612	-4,16525984
0,61210656	-0,30544409	0,68408370	-3,29781532
0,59371924	-0,39173329	0,71130693	-2,95885921
0,53548658	-0,44476295	0,69610339	-3,14652514
0,44333819	-0,45847988	0,63777155	-3,90669727
0,32482141	-0,43121213	0,53986377	-5,35431623
0,18825267	-0,36567062	0,41128346	-7,71717548

0,04203080	-0,26852745	0,27179694	-11,31510830
-0,10582945	-0,14963290	0,18327542	-14,73791599
-0,24794997	-0,02098767	0,24883662	-12,08171463
-0,37765744	0,10445987	0,39183798	-8,13786888
-0,48894221	0,21407713	0,53375417	-5,45317459
-0,57636833	0,29678422	0,64829111	-3,76459861
-0,63504040	0,34417075	0,72230870	-2,82554340
-0,66067624	0,35140470	0,74831700	-2,51828790
-0,64985812	0,31784198	0,72342161	-2,81216812
-0,60045034	0,24727857	0,64937454	-3,75009489
-0,51217657	0,14775436	0,53306305	-5,46442890
-0,38727060	0,03090699	0,38850194	-8,21213627
-0,23108448	-0,08916968	0,24769188	-12,12176418
-0,05251241	-0,19747846	0,20434111	-13,79288578

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SUM OF ABSOLUTE PRESSURES AT 21 POINTS/21,DUE TO TRANSDUCER BELOW SURFACE IS 0,56807834
DB=20,*LOG(PT1)= -4,91183567

THESE RESULTS=AVE, DB=20,*(SUM OFLOG(P(J)/R(J)) = -5,680860

TRANSDUCER IS AT 6,75 IN, FROM SURFACE AND STRING OF HYDROPHONES ARE LOCATED AT 6,00 IN, HOR, AND AT A DEPTH OF 11,25

FOLLOWING THREE SETS OF RESULTS ARE PRESSURES AND THE ABSOLUTE MAGNITUDES DUE TO LOWER TRANSDUCER
-VE UPPER TRANSDUCER & THE SUM OF ABOVE TWO SETS, THE LAST COLUMN =20,*LOG(ABS(PRESSURE))

-0,38534608	-0,30968532	0,49436486	-6,11904860
-0,44047672	-0,28338930	0,52376449	-5,61727905
-0,46404248	-0,23909803	0,52201849	-5,64628267
-0,45303768	-0,18279733	0,48852634	-6,22224045
-0,40745386	-0,12037154	0,42486227	-7,43503714
-0,33007318	-0,05702106	0,33496225	-9,50008297
-0,22608657	0,00312070	0,22610810	-12,91367817
-0,10258818	0,05715780	0,11743657	-18,60393333
0,03199969	0,10341589	0,10825352	-19,31116104
0,16853081	0,14125122	0,21989666	-13,15562725
0,29773983	0,17075244	0,34322789	-9,28834820
0,41083413	0,19236498	0,45363969	-6,86577988
0,50003552	0,20651430	0,54100245	-5,33601570
0,55908585	0,21327405	0,59838349	-4,46040821
0,58368099	0,21212776	0,62103277	-4,13770962
0,57182759	0,20187789	0,60641688	-4,34457493
0,52409291	0,18071406	0,55437440	-5,12393713
0,44372872	0,14646758	0,46727711	-6,60851002
0,33661538	0,09702694	0,35032007	-9,11069965
0,21101663	0,03089038	0,21326564	-13,42158318
0,07709128	-0,05220805	0,09310611	-20,62043762

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-0,09125408	0,08569091	0,12518083	-18,04924583
-0,06613311	0,09158404	0,11296560	-18,94107628
-0,04023297	0,09483580	0,10301708	-19,74181747
-0,01397282	0,09562445	0,09663993	-20,29686737
0,01226673	0,09417415	0,09496970	-20,44829941
0,03814868	0,09074310	0,09843593	-20,13692665
0,06337325	0,08561315	0,10651657	-19,45165825
0,08768083	0,07908060	0,11807485	-18,55685234
0,11084238	0,07144805	0,13187440	-17,59679031
0,13266204	0,06301626	0,14686818	-16,66144562
0,15297063	0,05407805	0,16224810	-15,79640770
0,17161952	0,04491065	0,17739849	-15,02100277
0,18848240	0,03577276	0,19184709	-14,34089661
0,20344527	0,02689706	0,20521556	-13,75579453
0,21640763	0,01848808	0,21719593	-13,26296711
0,22728261	0,01071569	0,22753508	-12,85903358
0,23598744	0,00371233	0,23601665	-12,54114723
0,24245010	-0,00242926	0,24246228	-12,30711555
0,24660580	-0,00766048	0,24672477	-12,15574551
0,24840121	-0,01197914	0,24868989	-12,08683872
0,24779265	-0,01543228	0,24827275	-12,10141945

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-0,47660017	-0,22399442	0,52661300	-5,57016850
-0,50660986	-0,19180526	0,54170364	-5,32476473
-0,50427544	-0,14426224	0,52450484	-5,60501051
-0,46701050	-0,08717287	0,47507676	-6,46472406
-0,39518714	-0,02619739	0,39605454	-8,04489994
-0,29192451	0,03372204	0,29386580	-10,63701916
-0,16271332	0,08873384	0,18533570	-14,64081860

-0,01490735	0,13623840	0,13705157	-17,26232147
0,14284207	0,17486395	0,22579031	-12,92589474
0,30119285	0,20426749	0,36392629	-8,77973175
0,45071048	0,22483049	0,50367516	-5,95696977
0,58245367	0,23727563	0,62892926	-4,02796412
0,68851793	0,24228705	0,72990406	-2,73468471
0,76253110	0,24017110	0,79945976	-1,94406796
0,80008864	0,23061584	0,83266175	-1,59062791
0,79911023	0,21259359	0,82690579	-1,65087950
0,76008034	0,18442638	0,78213501	-2,13436556
0,68617880	0,14403832	0,70113367	-3,08398366
0,58322120	0,08936647	0,59002823	-4,58254433
0,45941785	0,01891124	0,45980692	-6,74849033
0,32488394	-0,06764033	0,33185053	-9,58115005

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SUM OF ABSOLUTE PRESSURES AT 21 POINTS/21,DUE TO TRANSDUCER BELOW SURFACE IS 0,64853489
DB=20.*LOG(PT1)= -3,76133323

THESE RESULTS=AVE, DB=20.*(SUM OFLOG(P(J)/R(J)) = -4,663447

TRANSDUCER IS AT 6,75 IN, FROM SURFACE AND STRING OF HYDROPHONES ARE LOCATED AT 6,00 IN, HOR, AND AT A DEPTH OF 13,00

FOLLOWING THREE SETS OF RESULTS ARE PRESSURES AND THE ABSOLUTE MAGNITUDES DUE TO LOWER TRANSDUCER
-VE UPPER TRANSDUCER & THE SUM OF ABOVE TWO SETS, THE LAST COLUMN =20.*LOG(ABS(PRESSURE))

-0,45481992	-0,01612768	0,45510575	-6,83775377
-0,44974375	0,03206648	0,45088544	-6,91867590
-0,41908219	0,07426748	0,42561197	-7,41972351
-0,36516204	0,10664892	0,38041729	-8,39479542
-0,29145756	0,12670507	0,31780761	-9,95671368
-0,20225550	0,13333258	0,24224959	-12,31473923
-0,10233780	0,12677482	0,16292599	-15,76019287
0,00329230	0,10846397	0,10851394	-19,29029083
0,10963734	0,08078530	0,13618596	-17,31735420
0,21188590	0,04678502	0,21698959	-13,27122211
0,30554074	0,00984612	0,30569932	-10,29411125
0,38652590	-0,02664691	0,38744330	-8,23583698
0,45126435	-0,05962587	0,45518655	-6,83621216
0,49675474	-0,08662610	0,50425130	-5,94705963
0,52064812	-0,10602406	0,53133380	-5,49265099
0,52134168	-0,11720297	0,53435349	-5,44342709
0,49808633	-0,12063804	0,51248759	-5,80633307
0,45110309	-0,11788947	0,46625310	-6,62756586
0,38171154	-0,11147950	0,39765736	-8,00981998
0,29243407	-0,10466953	0,31060165	-10,15592480
0,18706162	-0,10113193	0,21264927	-13,44672203

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0,00897303	-0,10770953	0,10808264	-19,32488060
-0,01163361	-0,09864043	0,09932409	-20,05890846
-0,03137226	-0,08760696	0,09305482	-20,62522507
-0,05008724	-0,07491773	0,09011880	-20,90369225
-0,06766387	-0,06088639	0,09102501	-20,81678581
-0,08402468	-0,04582217	0,09570694	-20,38113213
-0,09912401	-0,03002929	0,10357281	-19,69508553
-0,11294417	-0,01380170	0,11378432	-18,87835121
-0,12548585	0,00257806	0,12551233	-18,02627182
-0,13676819	0,01884613	0,13806055	-17,19860840
-0,14681983	0,03475260	0,15087679	-16,42755127
-0,15567723	0,05006776	0,16353036	-15,72803307
-0,16337846	0,06457981	0,17567889	-15,10560894
-0,16996080	0,07809938	0,18704595	-14,56103420
-0,17545445	0,09045649	0,19739971	-14,09307003
-0,17988494	0,10150729	0,20654859	-13,69955540
-0,18326546	0,11112931	0,21432675	-13,37847233
-0,18559691	0,11922631	0,22059268	-13,12817955
-0,18686667	0,12572858	0,22522618	-12,94762421
-0,18704949	0,13059725	0,22812970	-12,83636379
-0,18610336	0,13382289	0,22922266	-12,79485035

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-0,44584689	-0,12383721	0,46272576	-6,69352674
-0,46137735	-0,06657396	0,46615574	-6,62937927
-0,45045444	-0,01333947	0,45065188	-6,92317677
-0,41524929	0,03173120	0,41645989	-7,60853672
-0,35912144	0,06581868	0,36510316	-8,75166896
-0,28628018	0,08751041	0,29935667	-10,47622108
-0,20148182	0,09674554	0,22348727	-13,01494503

-0,10965187	0,09466228	0.14486021	-16,78101921
-0,01584851	0,08336337	0.08485651	-21,42629623
0,07511771	0,06563115	0,09975029	-20,02171707
0,15872091	0,04459873	0.16486774	-15,65728664
0.23084867	0,02342085	0.23203370	-12,68897915
0,28788590	0,00495395	0,28792852	-10,81430721
0,32679394	-0,00852672	0,32690516	-9,71156406
0,34519368	-0,01556756	0.34554452	-9,22992039
0,34145674	-0,01569568	0.34181729	-9,32411957
0,31482089	-0,00950873	0,31496447	-10,03476906
0,26550618	0,00133684	0.26550958	-11,51839733
0,19484487	0,01424908	0.19536521	-14,18305683
0,10538457	0,02592772	0,10852721	-19,28922644
0,00095826	0,03269096	0,03270500	-29,70771790

****

SUM OF ABSOLUTE PRESSURES AT 21 POINTS/21,DUE TO TRANSDUCER BELOW SURFACE IS 0,38824430
DB=20,*LOG(PT1)= -8,21789837

THESE RESULTS=AVE. DB=20,*(SUM OFLOG(P(J)/R(J)) = -9,665609 DB_5

****

RESULTS FOR HYDROPHONES AT 6,00 IN.

20,*LOG(AVERAGE OF 105 PRESSURES)= -5,85430527
AVERAGE OF(20,LOG(PRESSURE))= -7,03642559 $= \sum_{i=1}^{5} DB_i$

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TM No. 841087

ACOUSTIC RADIATION FROM TRANSDUCER IN SEMI-INFINITE FLUID MEDIUM (U)
Jayant S. Patel
Engineering Mechanics Division
Engineering & Technical Support Department
TM No. 841087
Job Order No.K96714

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